INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PROJECT INDEX

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
FEDERAL HIGHWAY IMPROVEMENT

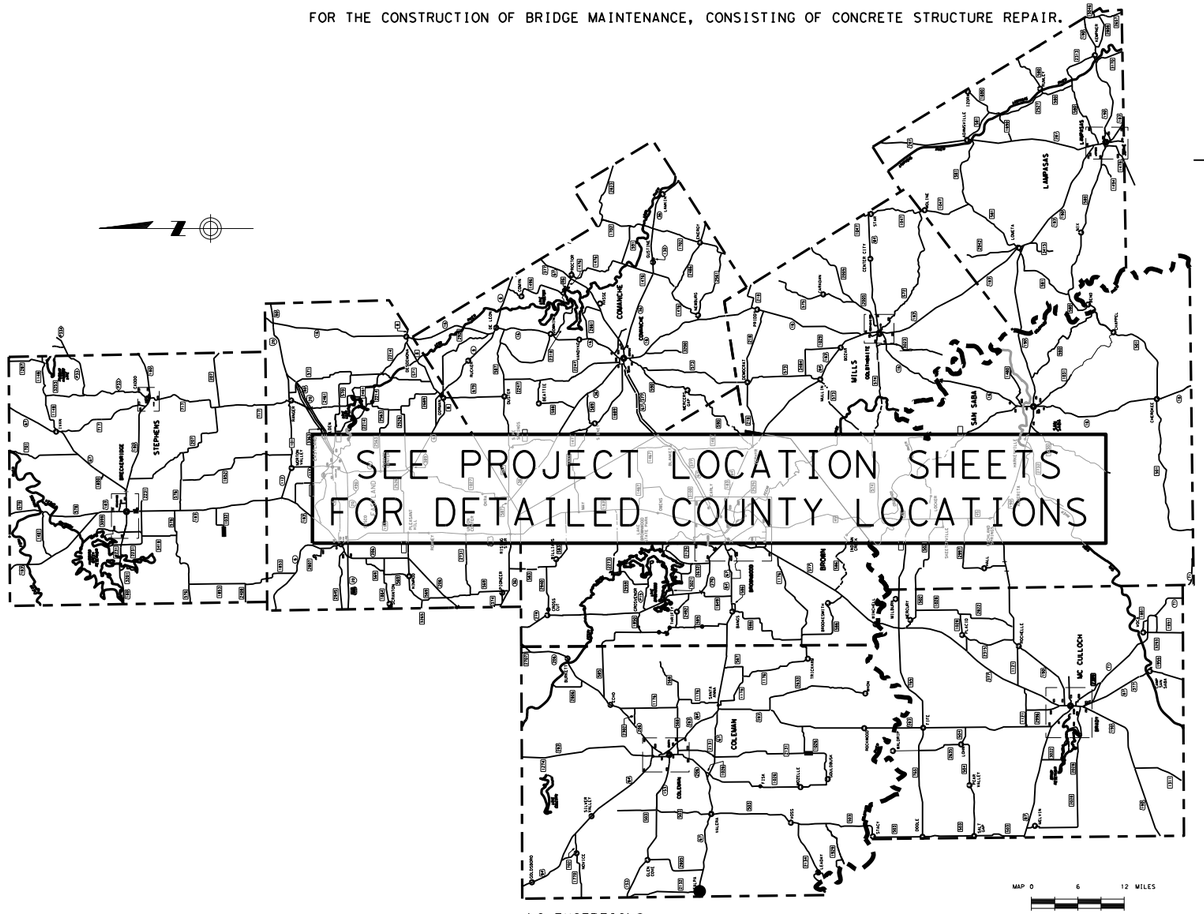
FEDERAL AID PROJECT NO. BR 2022(129),ETC.

SH 16,ETC.
COMANCHE,ETC

NET LENGTH OF ROADWAY= VARIOUS
NET LENGTH OF BRIDGE= VARIOUS
NET LENGTH OF PROJECT= VARIOUS

LIMITS: SABANNA RIVER

FOR THE CONSTRUCTION OF BRIDGE MAINTENANCE, CONSISTING OF CONCRETE STRUCTURE REPAIR.



NO EXCEPTIONS
NO EQUATIONS
2 RAILROAD CROSSINGS - UP RR DOT# 839 272J
BNSF RR DOT# 021 216N

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOV 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT. REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012)

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FEDERAL PROJECT NO.			
BR 2022(129),ETC			
CONT	SECT	JOB	HIGHWAY
0288	01	039,ETC.	SH 16,ETC.
DIST	COUNTY		SHEET NO.
023	COMANCHE,ETC		1

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS AND CONTRACT.

P.E. _____ DATE _____

Texas Department of Transportation®

SUBMITTED FOR LETTING: 9/3/2021

DocuSigned by:
Dan A. Hodnemann, P.E.
2E74F333C7B14AA...
DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING: 9/3/2021

DocuSigned by:
J.H. Stitt, P.E.
77D14777834646F...
DISTRICT DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING: 9/3/2021

DocuSigned by:
Elias Rmeili, P.E.
BB9FD402431A4A3...
DISTRICT ENGINEER

DATE: 8/31/2021 10:10:43 AM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\TITLE SHEET.dgn

INDEX OF SHEETS

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS Sct, P.E.

09/07/2021

THE STANDARD SHEETS LISTED ON THIS SHEET HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		2

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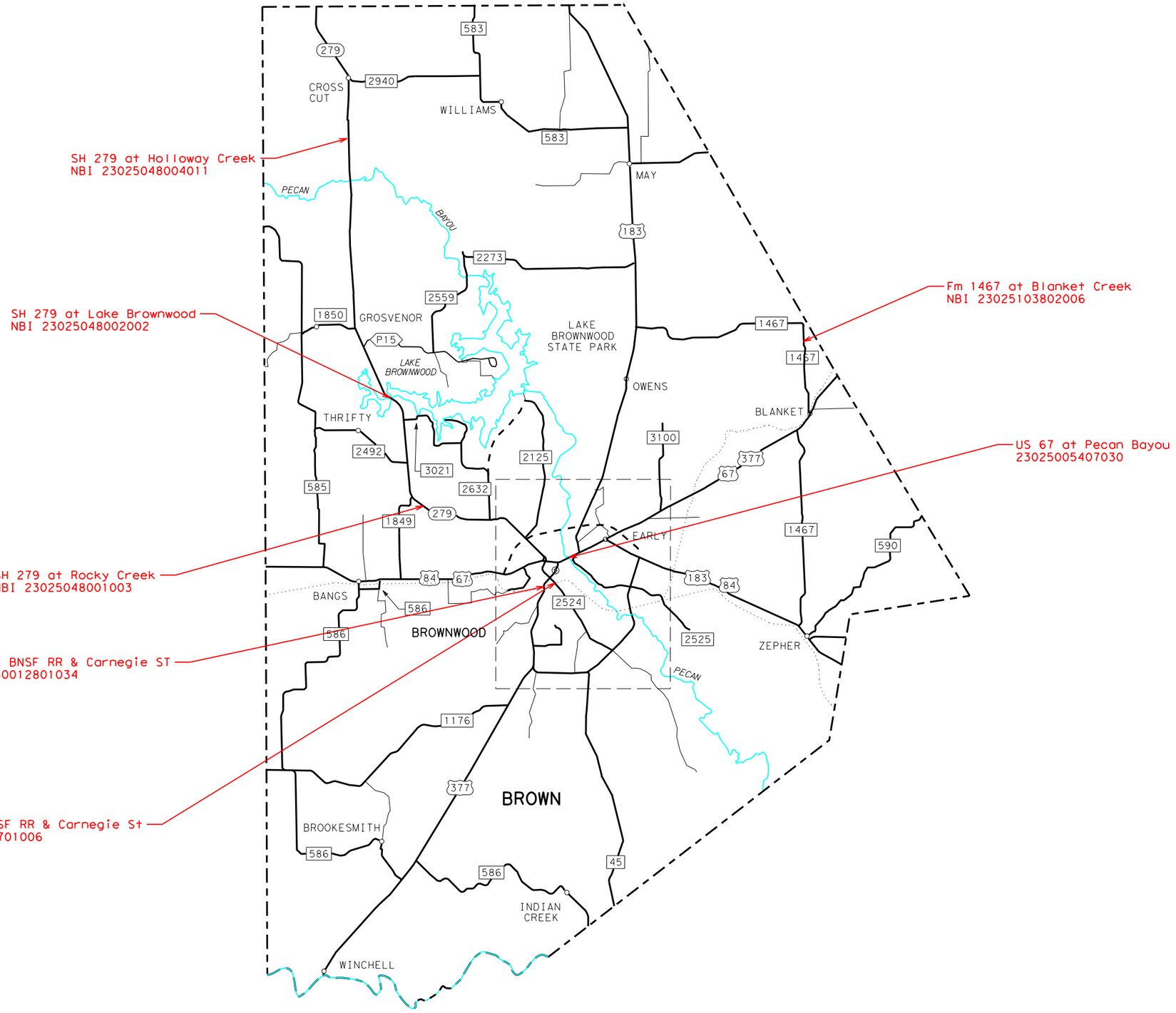

JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

08/19/2021

BROWN COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		3

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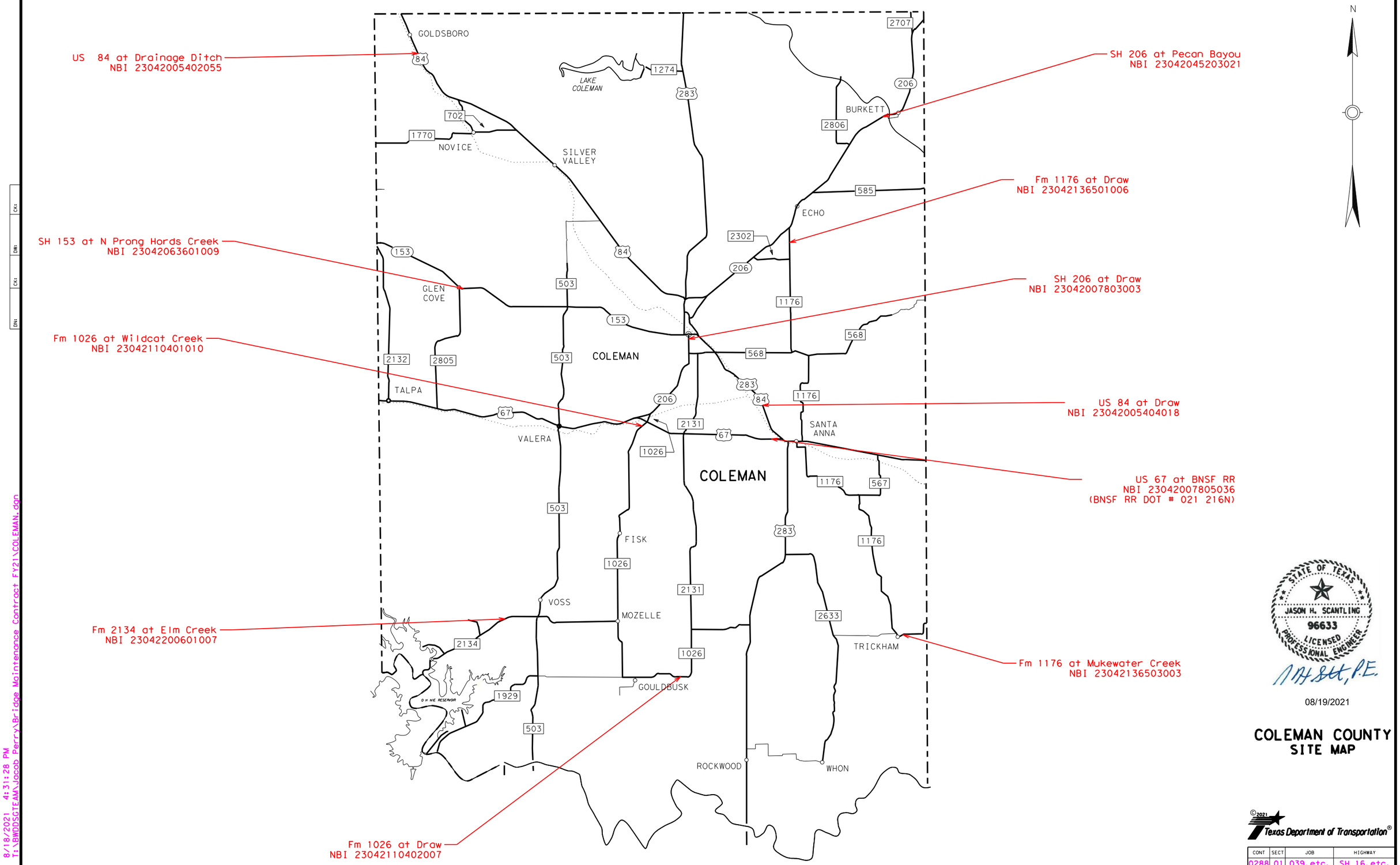

JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

08/19/2021

COLEMAN COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		4

DATE: 8/18/2021 4:31:28 PM
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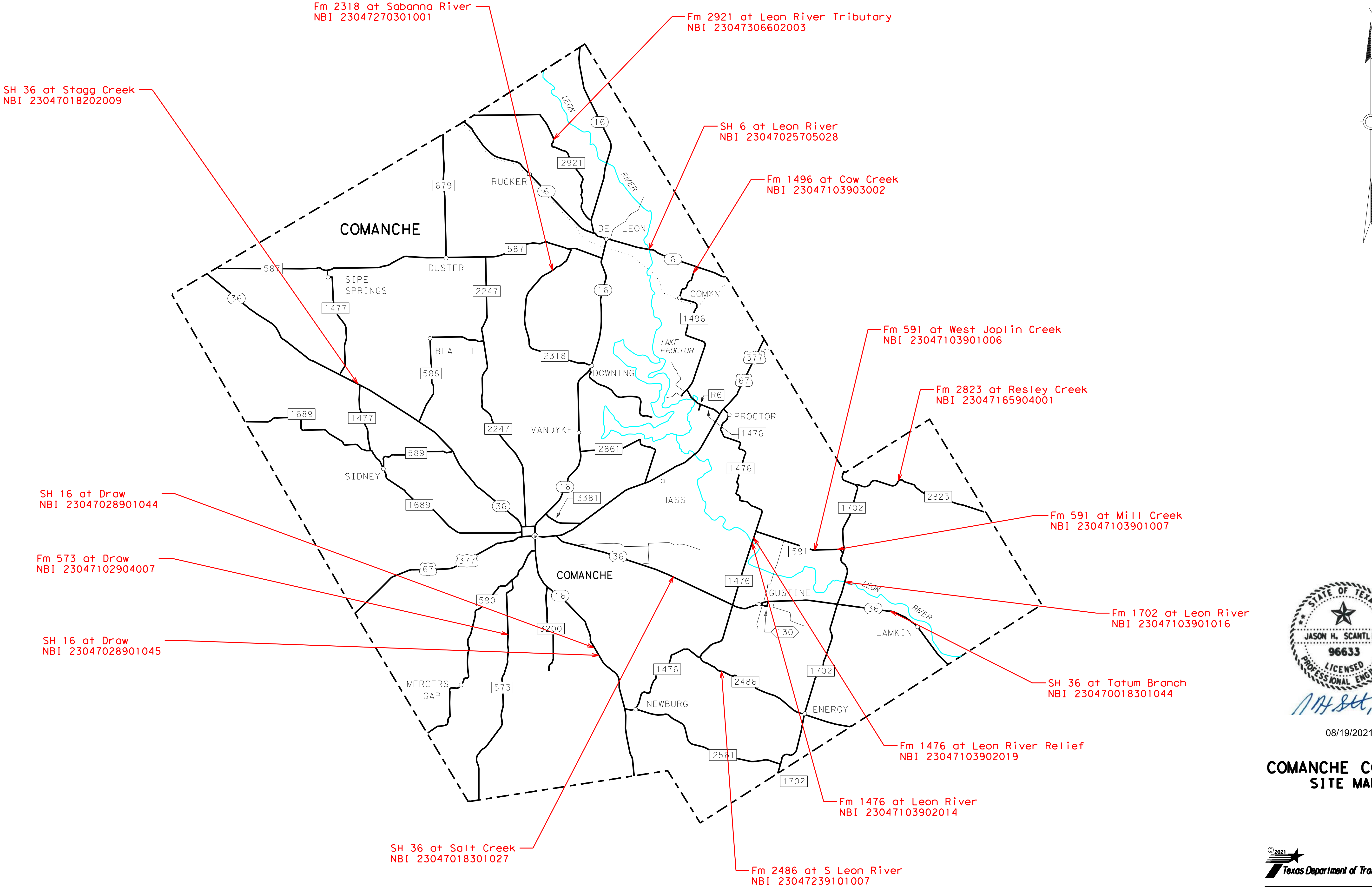
Fm 2318 at Sabanna River
NBI 23047270301001
Fm 2921 at Leon River Tributary
NBI 23047306602003
SH 36 at Stagg Creek
NBI 23047018202009
SH 6 at Leon River
NBI 23047025705028
Fm 1496 at Cow Creek
NBI 23047103903002
Fm 591 at West Joplin Creek
NBI 23047103901006
Fm 2823 at Resley Creek
NBI 23047165904001
SH 16 at Draw
NBI 23047028901044
Fm 591 at Mill Creek
NBI 23047103901007
Fm 573 at Draw
NBI 23047102904007
Fm 1702 at Leon River
NBI 23047103901016
SH 16 at Draw
NBI 23047028901045
SH 36 at Tatum Branch
NBI 230470018301044
Fm 1476 at Leon River Relief
NBI 23047103902019
Fm 1476 at Leon River
NBI 23047103902014
SH 36 at Salt Creek
NBI 23047018301027
Fm 2486 at S Leon River
NBI 23047239101007
N
COMANCHE
RUCKER
DE LEON
DUSTER
SIPE SPRINGS
COMYN
LAKE PROCTOR
BEATTIE
DOWNING
PROCTOR
VANDYKE
SIDNEY
HASSE
COMANCHE
GUSTINE
LAMKIN
MERCERS GAP
NEWBURG
ENERGY
LEON RIVER
LEON RIVER

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED PROFESSIONAL ENGINEER

08/19/2021

COMANCHE COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST		COUNTY	SHEET NO.
BWD		COMANCHE, ETC.	5

DATE: 8/18/2021 4:31:29 PM
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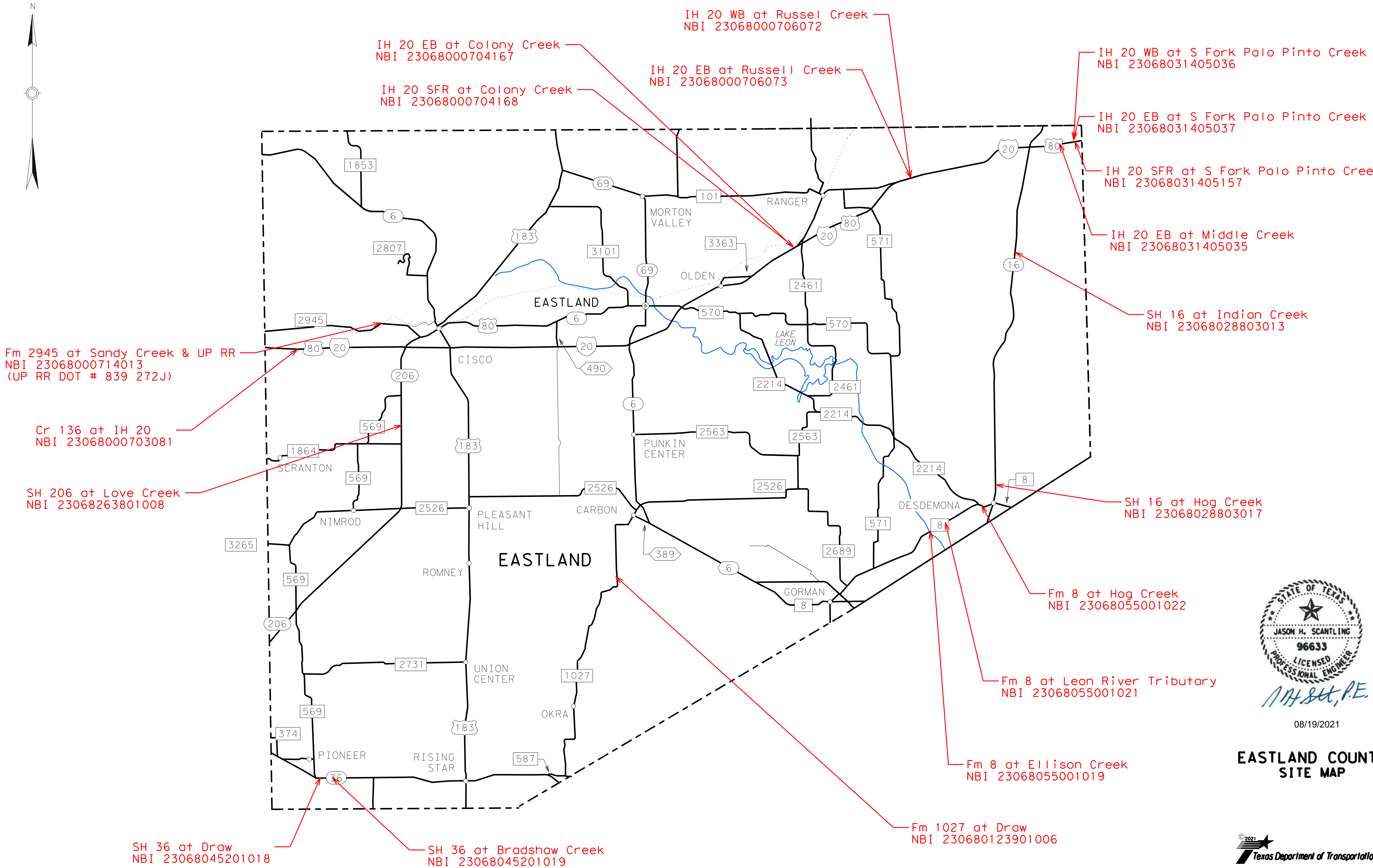

N
IH 20 WB at Russel Creek
NBI 23068000706072
IH 20 EB at Colony Creek
NBI 23068000704167
IH 20 EB at Russell Creek
NBI 23068000706073
IH 20 SFR at Colony Creek
NBI 23068000704168
IH 20 WB at S Fork Palo Pinto Creek
NBI 23068031405036
IH 20 EB at S Fork Palo Pinto Creek
NBI 23068031405037
IH 20 SFR at S Fork Palo Pinto Creek
NBI 23068031405157
IH 20 EB at Middle Creek
NBI 23068031405035
SH 16 at Indian Creek
NBI 23068028803013
Fm 2945 at Sandy Creek & UP RR
NBI 23068000714013
(UP RR DOT # 839 272J)
Cr 136 at IH 20
NBI 23068000703081
SH 206 at Love Creek
NBI 23068263801008
SH 16 at Hog Creek
NBI 23068028803017
Fm 8 at Hog Creek
NBI 23068055001022
Fm 8 at Leon River Tributary
NBI 23068055001021
Fm 8 at Ellison Creek
NBI 23068055001019
Fm 1027 at Draw
NBI 23068012390100б
SH 36 at Draw
NBI 23068045201018
SH 36 at Bradshaw Creek
NBI 23068045201019
RANGER
MORTON VALLEY
OLDEN
EASTLAND
CISCO
LAKE LEON
SCRANTON
NIMROD
PLEASANT HILL
CARBON
PUNKIN CENTER
DESDEMONA
GORMAN
ROMNEY
UNION CENTER
OKRA
PIONEER
RISING STAR
EASTLAND
1853
6
2807
183
69
3101
101
3363
80
20
571
16
2461
570
2945
490
206
2214
569
1864
2563
2526
8
3265
389
2689
2731
1027
374
36
587

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
P.E.

08/19/2021

EASTLAND COUNTY SITE MAP

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CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST		COUNTY	SHEET NO.
BWD		COMANCHE, ETC.	6

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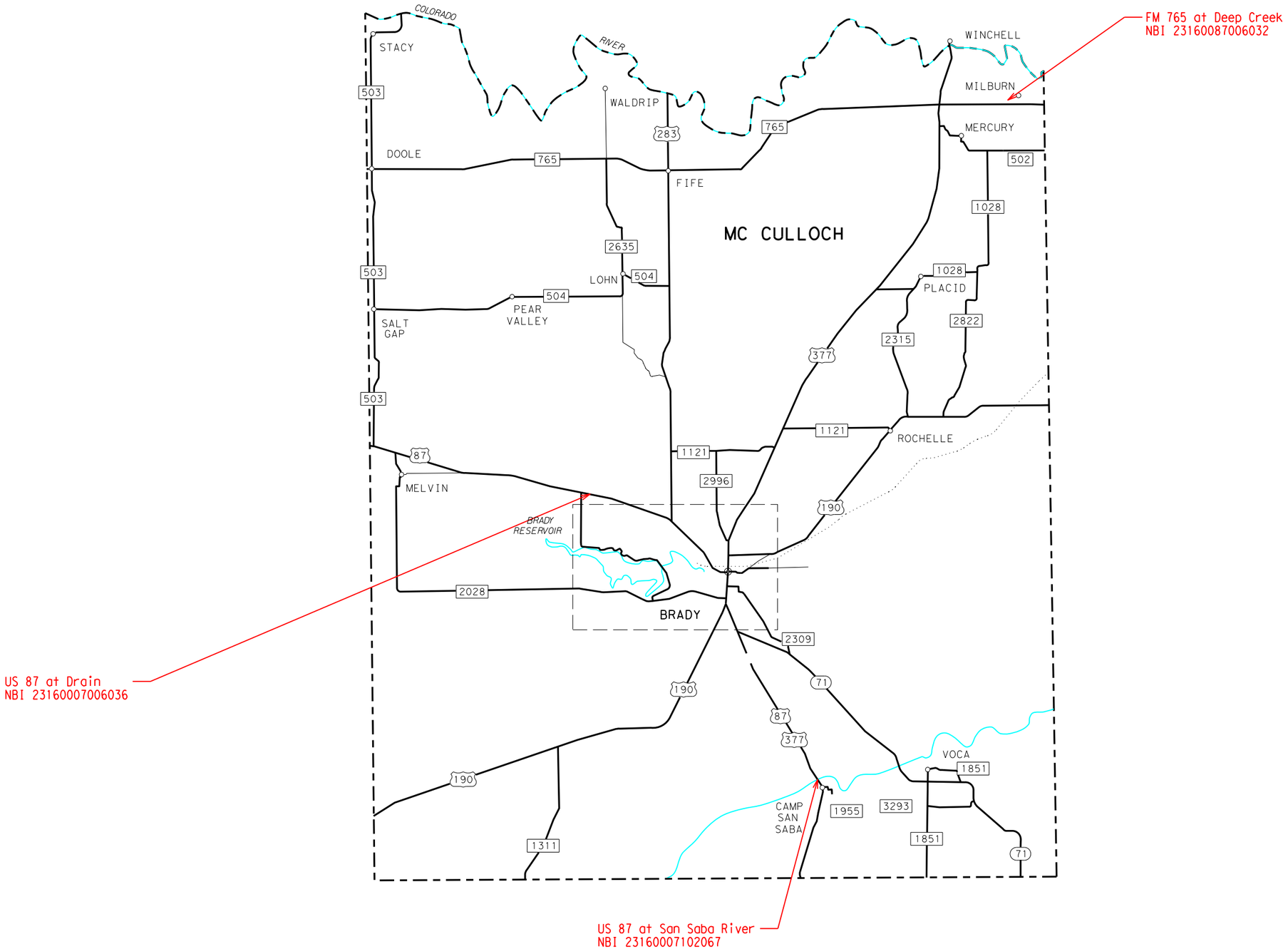

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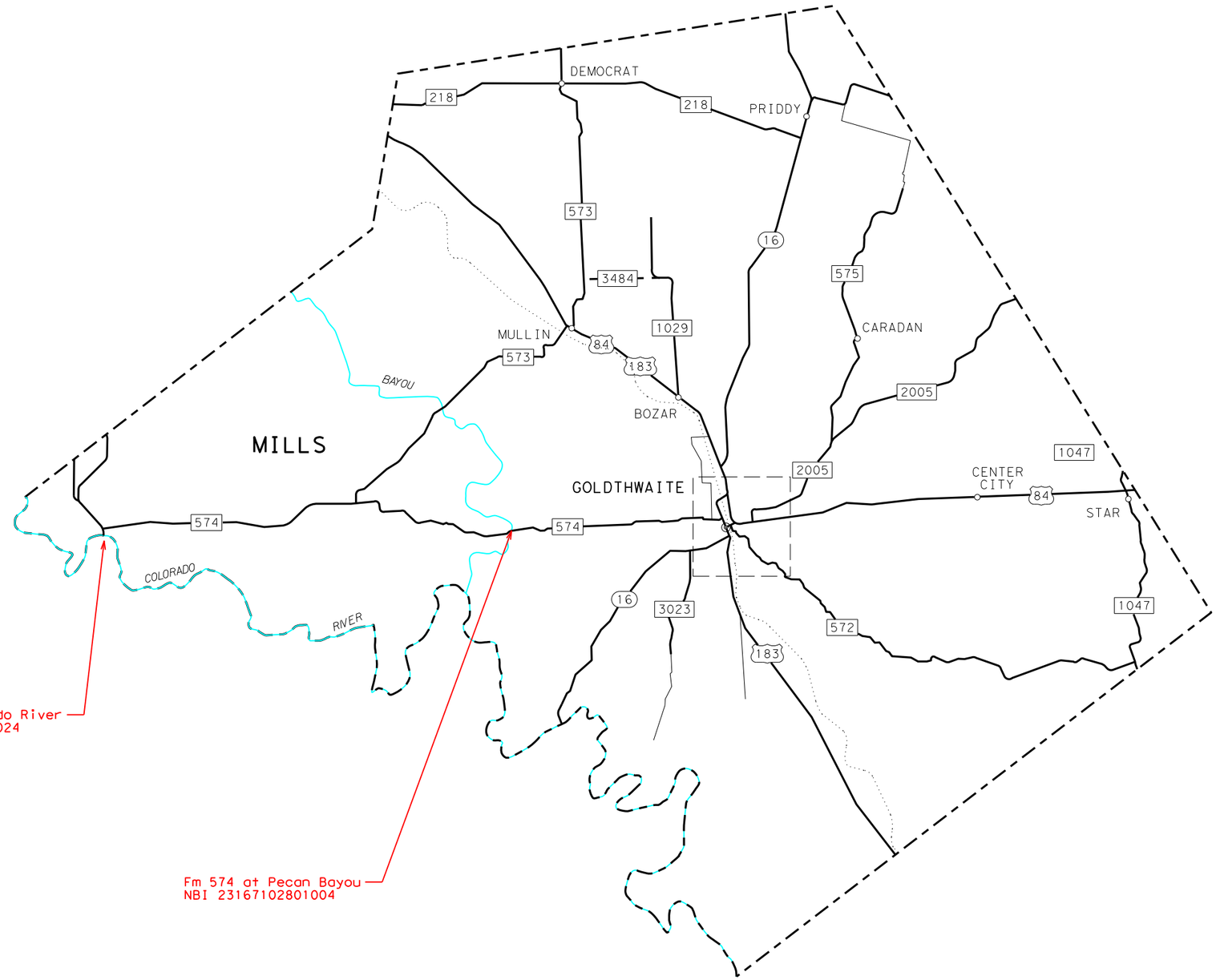
DN: CK: DW: CK:

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

McCULLOCH COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		7



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STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

MILLS COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		8

DATE: 8/18/2021 4:31:32 PM
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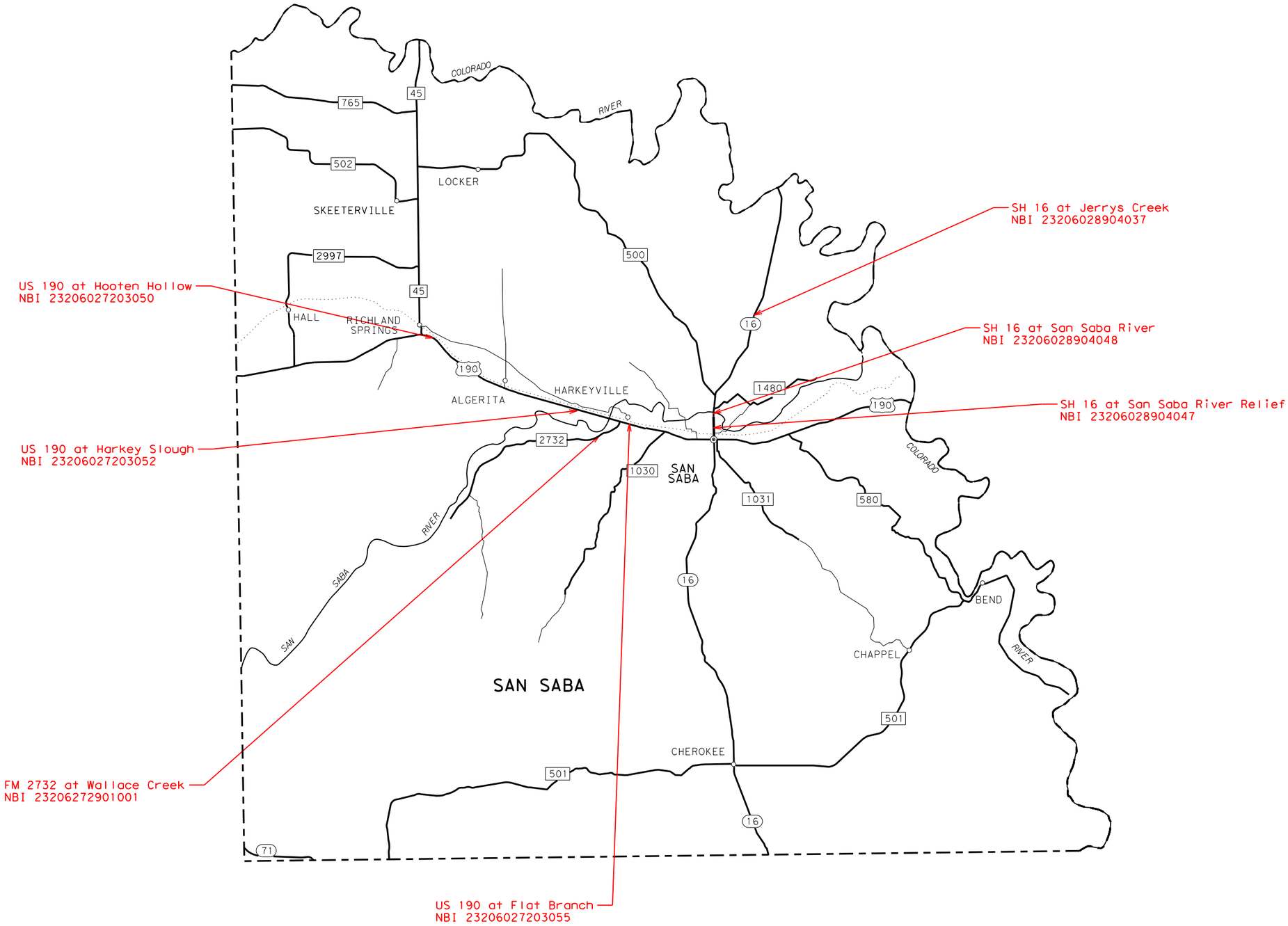

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STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

SAN SABA COUNTY SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		9

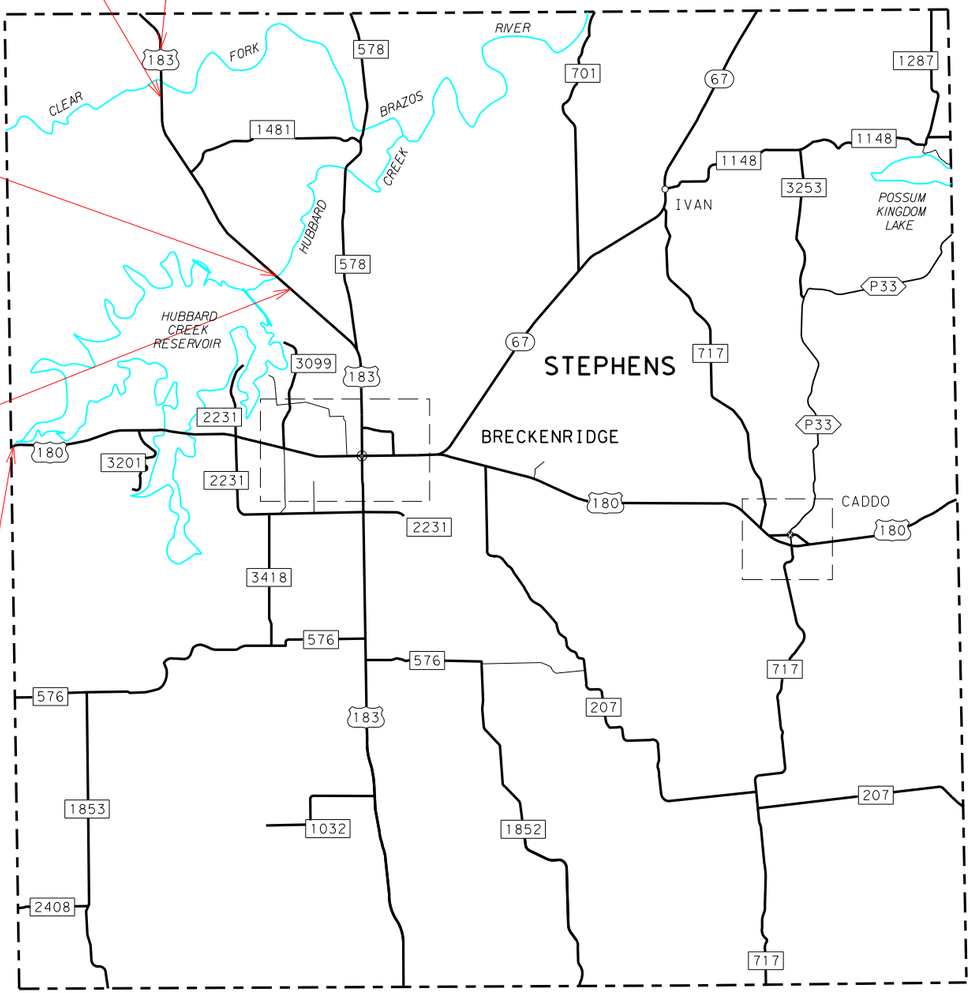
US 183 at Givens Creek
NBI 23215040402022

US 183 at Clear Fork Brazos Ri Rel
NBI 23215040402024

US 183 at Hubbard Creek
NBI 23215040402015

US 183 at Draw
NBI 23215040402017

US 180 at Hubbard Creek Relief
NBI 23215001107027



N

JASON H. SCANTLING
96633
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

08/19/2021

STEPHENS COUNTY
SITE MAP

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		10

DATE: 8/18/2021 4:31:34 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\STEPHENS.dgn

ENVIRONMENTAL GENERAL NOTES

The Contractor will not be allowed to store equipment, materials, incidentals, hazardous chemicals, petroleum products, concrete washouts, etc. in the Department's R.O.W. without written permission from the Engineer.

See the "Environmental" section of the plans for additional information.

To prevent spread of Zebra Mussels and other exotic species:

1. Spray/rinse all equipment and vehicles, using hot and/or high-pressure water as soon as possible after exiting the waterbody.
2. Drain all water from receptacles before leaving the area, and
3. Allow all equipment to dry completely before use in another waterbody
4. If zebra mussels are encountered at the project location, contractor will not transport any equipment from the site and will notify the TxDOT project engineer immediately.

For more detailed information, see: https://tpwd.texas.gov/fishboat/boat/protect_water/

TEXAS ONE CALL

Fiber optic cable systems, gas lines, underground power lines, water lines, sewer lines, and other various utilities may be buried within the project limits. Protection of these utility systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The Contractor will telephone Texas One Call at 1-800-344-8377 (a 24-hour number), to determine if utilities are buried anywhere on the project in accordance with all UNDERGROUND FACILITY DAMAGE PREVENTION AND SAFETY laws. This action; however, will in no way be interpreted as relief of responsibilities under the terms of the Contract as set out in the plans and specifications. Coordinate the repair of all damages caused by daily operations and have facilities restored to service in a timely manner as directed at no additional cost to TxDOT.

GENERAL

Unless specifically noted as applying to only a certain project or projects, these general notes will apply to all projects associated to this contract.

Contractor questions on this project are to be addressed to the following individual(s):

Name	Email Address
Jordan Perry, P.E..	Jordan.perry@txdot.gov

County: Comanche, etc. **Sheet 11**

Highway: SH 16, etc. **Control:** 0288-01-039, etc.

Contractor questions will be accepted through email, phone, and in person by the above individual(s).

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

The term "Article" or "Section" referred to hereon is defined in the forward of the *Standard Specifications for Construction and Maintenance of Highways, Streets, And Bridges* adopted by the Texas Department of Transportation November 2014.

ITEM 5 CONTROL OF WORK

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

ITEM 6 CONTROL OF MATERIALS

In accordance with **Section 6.10.2**, the Contractor will dispose of all painted steel at a steel recycling or smelting facility and a receipt will be required. In lieu of this, the Contractor has the option to either show proof that the paint is lead free or show proof that the lead paint has been abated by an abatement certified company. The Department will not be obligated for the cost of paint testing and/or abatement materials, processes, personnel, incidentals, etc.

See **SP 006-012** for additional information.

The following structures have been identified to have lead paint present:
23-042-0-0078-05-036
23-047-0-0257-05-028
23-047-0-1039-02-014
23-215-0-0404-02-015

ITEM 7 LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

ITEM 8 PROSECUTION AND PROGRESS

Working days will be computed and charged in accordance with Section 8.3.1.4. “Standard Workweek”.

Work will not be performed without time being charged unless otherwise exempted by the Section as defined above.

PROJECT SCHEDULES

Critical Path Method (CPM) scheduling will be required to be submitted and maintained monthly by the Contractor unless otherwise directed by the Engineer. (8.5.2.)

For monthly submittals, the Contractor will provide the schedule in an Adobe Acrobat compatible format (PDF file). If the Engineer requests the schedule in an electronic format, the Contractor will submit a schedule that is fully compatible with Primavera P6 Professional Release 15.

ITEM 9 MEASUREMENT AND PAYMENT

Monthly estimates will be computed from the 28th of the previous month through the 27th of the current month unless otherwise approved in writing by the Engineer.

ITEM 164 SEEDING FOR EROSION CONTROL

The Contractor should anticipate multiple mobilizations for seeding at each project location.

ITEM 166 FERTILIZER

Fertilize all areas of project to be seeded.

Furnish and apply fertilizer with analysis of 20-10-10 at a rate of 300 bulk pounds per acre.

ITEM 401 FLOWABLE BACKFILL

All flowable backfill will be “Non-Excavatable” unless otherwise specified.

Adequate lead pressure shall be maintained with flowable fill in order to sufficiently fill voids under riprap. Access holes may be required down slope in order to verify suitable backfilling operations.

Use a minimum of four (4) sacks cement per cubic yard.

Type I Cement is required if accelerator is used.

ITEM 421 HYDRAULIC CEMENT CONCRETE

Furnish dome lids with 4” x 8” cylinder test molds.

County: Comanche, etc. **Sheet 11A**

Highway: SH 16, etc. **Control:** 0288-01-039, etc.

Strength testing equipment is not required for Contract controlling test.

ITEM 422 CONCRETE SUPERSTRUCTURES

Transverse saw-cut grooves will be required in the bridge deck and will not be paid for directly but will be considered subsidiary to the various bridge items

ITEM 429 CONCRETE STRUCTURE REPAIR

Submit repair materials to the Engineer. Materials must be capable of overhead repairs.

If required, drill and install anchor bars using TY III Class “C” epoxy adhesive meeting DMS-6100 “Epoxy Adhesives.”

ITEM 432 RIPRAP

Locations and quantities may be varied as directed by the Engineer to accommodate field conditions.

Use dry riprap for the stone protection item. Stones shall be graded so as not to obstruct full channel flow. Filter fabric is required.

Limit excavation to within 1’ of riprap. If excavation exceeds these limits without the Engineer’s approval, riprap will be extended to the limits of the disturbance. No additional compensation will be allowed for this work.

ITEM 438 CLEANING AND SEALING JOINTS

Clean all joints full depth from top of the slab to the top of cap. This includes joints that have end diaphragms sitting on caps.

Clean all caps of loose material.

Clean all steel and concrete with a 5000 psi water pressure blast and allow to dry thoroughly prior to placing joint material and sealant.

ITEM 459 GABIONS AND GABION MATTRESSES

Type 2 filter fabric in accordance with DMS6200, “Filter Fabric” is required for this project.

Locations and quantities may be varied as directed by the Engineer to accommodate field conditions.

Limit excavation to within 1’ of the gabion(s) or gabion mattress(s). If excavation exceeds these limits without the Engineer’s approval, the gabion(s) or gabion mattress(s) will be extended to the limits of the disturbance. No compensation for the additional work will be allowed.

ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING

The Contractor will be required to keep all TCP devices clean. If notified by the Engineer to clean the TCP devices, the Contractor will have until the end of that daylight period to comply. Failure to comply will result in a suspension of all work until the TCP devices are clean. Time will not be suspended.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

The Engineer will determine the locations of regulatory construction speed zone signs. The Contractor will furnish, install and remove speed zone signs at locations as directed by the Engineer.

Excavations in Intersections adjacent to travel lanes will not be exposed or open overnight. Backfilling will take place the day excavations are made.

The Contractor will be responsible for maintaining the edge of the roadway throughout the project in a traversable condition and/or as directed by the Engineer. Salvaged milling may be used as directed by the Engineer. This work will not be paid for directly and will be considered subsidiary to Item 502 "Barricades, Signs, and Traffic Handling".

All devices shown on the TCP Standards are required and considered subsidiary to Item 502 unless specifically outlined elsewhere in the plans.

All signs will be constructed in accordance with the details shown in the current Standard Highway Sign Designs for Texas manual.

ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

The Contractor should anticipate multiple mobilizations for the installation of BMP's on this project.

The Engineer will determine actual time and placement locations of BMP's and temporary measures.

Contractor will not install BMPs until locations are approved by the Engineer.

Stockpile sites may be cleared of cover vegetation, but the vegetation root system will not be destroyed.

ITEM 512 PORTABLE TRAFFIC BARRIER

Portable Concrete Traffic Barrier will be used at specified locations for protection of workmen and the traveling public. When barrier sections are stockpiled on the project they will be placed in a location that will not endanger the traveling public.

County: Comanche, etc. **Sheet 11B**

Highway: SH 16, etc. **Control:** 0288-01-039, etc.

830 LF of PCTB for Phased construction is located at the intersection of Spur 490 and IH 20.

When transporting PCTB to and from the stockpile location, Interstate mainlanes shall be used as much as practical to avoid unnecessary damage to interstate frontage roads.

Connection hardware for the PCTB is located at the Eastland County Maintenance Yard. Return PCTB and connection hardware to the same locations unless otherwise directed by the Engineer.

Contact the Engineer 72 hours in advance of picking up PCTB.

ITEM 545 CRASH CUSHION ATTENUATORS

Crash Cushion Attenuators will be supplied by the Contractor.

ITEM 662 WORK ZONE PAVEMENT MARKINGS

Removable work zone pavement markings will be raised pavement markers unless otherwise approved by the Engineer.

ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN

2 portable changeable message signs are estimated for this project and will be placed as directed by the Engineer.

ITEM 6185 TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)

Provide the number of vehicles with truck mounted attenuators (TMA) listed in the table below. The Contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

STANDARD / PHASE	# TMA'S REQUIRED
TCP(1-1)	1
TCP(1-2)	1
TCP(1-3)	1 per workspace
TCP(1-4)	1
TCP(1-5)	1
TCP(1-6)	1
TCP(2-1)	1
TCP(2-2)	1
TCP(2-3)	1 per workspace
TCP(2-4)	1
TCP(2-5)	1
TCP(2-6)	1
TCP(2-7)	0
TCP(2-8)	0
TCP(3-1)	2
TCP(3-2)	3
TCP(3-3)	2 or 3
TCP(3-4)	1 or 2 per workspace
TCP(3-5)	1
TCP(5-1)	1
TCP(6-1)	1 or 2
TCP(6-2)	1
TCP(6-3)	1
TCP(6-4)	1 or 2
TCP(6-5)	1 or 2
TCP(6-6)	1 per lane
TCP(6-7)	Refer to TCP(6-6)
TCP(6-8)	1
TCP(6-9)	1
TCP(7-1)	N/A to be used in conjunction with another TCP
WZ(BTS-1) & WZ(BTS-2)	1

See sheet “TCP SUMMARY” in plans for estimated quantities.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0288-01-039 **DISTRICT** Brownwood **COUNTY** Brown, Comanche
HIGHWAY SH 16, Various

			CONTROL SECTION JOB	**0288-01-039**		**0923-00-064**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00180485**		**A00141061**			
			COUNTY	**Comanche**		**Brown**			
			HIGHWAY	**SH 16**		**Various**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	110-6002	EXCAVATION (CHANNEL)	CY			289.000		289.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY			3,900.000		3,900.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY			1,950.000		1,950.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY			1,950.000		1,950.000	
	401-6001	FLOWABLE BACKFILL	CY	167.000		258.000		425.000	
	420-6158	CL C CONC(PILE ENCASEMENT)	LF			36.000		36.000	
	427-6006	EPOXY WATERPROOF FINISH	SF	640.000		5,000.000		5,640.000	
	429-6001	CONC STR REPAIR(CLEAN & COAT WTH EPOXY)	SF			236.000		236.000	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF			27.000		27.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF			1,000.000		1,000.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	32.000		348.000		380.000	
	429-6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	EA	160.000		1,286.000		1,446.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY			7.000		7.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY			359.000		359.000	
	432-6037	RIPRAP (STONE PROTECTION) (36 IN)	CY			180.000		180.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF			4,558.000		4,558.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF			136.000		136.000	
	446-6028	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)	LS			6.000		6.000	
	459-6001	GABIONS (GALV)	CY			60.000		60.000	
	459-6007	GABION MATTRESSES (GALV)(12 IN)	SY			225.000		225.000	
	480-6001	CLEAN EXIST CULVERTS	EA			4.000		4.000	
	495-6001	RAISING EXIST STRUCT	LS			1.000		1.000	
	500-6001	MOBILIZATION	LS	0.050		0.950		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.000		11.000		12.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF			2,600.000		2,600.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF			2,600.000		2,600.000	
	510-6004	ONE-WAY TRAFFIC CONTROL (PORT TRAF SIG)	DAY	30.000		30.000		60.000	
	512-6013	PORT CTB (DES SOURCE)(SGL SLP)(TY 1)	LF			960.000		960.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF			960.000		960.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF			960.000		960.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA			1.000		1.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA			1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA			1.000		1.000	
	662-6057	WK ZN PAV MRK REMOV (TRAF BTN) TY W	LF			3,480.000		3,480.000	
	662-6059	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	LF			1,740.000		1,740.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF			440.000		440.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF			1,740.000		1,740.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0288-01-039 **DISTRICT** Brownwood **COUNTY** Brown, Comanche
HIGHWAY SH 16, Various

			CONTROL SECTION JOB		**0288-01-039**		**0923-00-064**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00180485**		**A00141061**			
			COUNTY		**Comanche**		**Brown**			
			HIGHWAY		**SH 16**		**Various**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)		LF			1,740.000		1,740.000	
	672-6010	REFL PAV MRKR TY II-C-R		EA			18.000		18.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")		LF			3,380.000		3,380.000	
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)		LF			27.000		27.000	
	784-6009	REP STL BRIDGE MEMBER (SHOES)		EA			1.000		1.000	
	4002-6001	REPLACE ELASTOMERIC BEARING PADS		EA			1.000		1.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	30.000		135.000		165.000	
	6185-6002	TMA (STATIONARY)		DAY	17.000		175.000		192.000	
	7000-6001	REML & DISPL DRIFTWOOD & DEBRIS		CY			1,207.000		1,207.000	
	08	RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (NON-PARTICIPATING)		LS	1.000				1.000	
		EROSION CONTROL MAINTENANCE (NON-PART)		LS	1.000				1.000	
		SAFETY CONTINGENCY (NON-PART)		LS	1.000				1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000				1.000	

Bridge Structure ID	Bridge Description	Bridge & Quanity																						
		432-6035	401-6001	7000-6001	429-6007	446-6028	432-6037	432-6031	480-6001	438-6002	438-6004	429-6001	784-6009	780-6002	110-6002	420-6158	459-6001	459-6007	429-6005	429-6003	429-6023	495-6001	4002-6001	427-6006
		RIPRAP (24 IN) STONE PROTECTION	FLOWABLE BACKFILL	REMOVE & REPLACE DRIFTWOOD AND DEBRIS	CONCRETE STRUCTURE REPAIR (VERTICAL & OVERHEAD)	SPOT CLEAN & PAINT EXIST STR (SPL PRT SYS)	RIPRAP (36 IN) STONE PROTECTION	RIPRAP (12 IN) STONE PROTECTION	CLEAN EXIST CULVERTS	CLEAN & SEAL EXIST JOINTS(CL3)	CLEAN & SEAL EXIST JOINTS(CL7)	CONCRETE STRUCTURE REPAIR (CLEAN & COAT W/ EPOXY)	REPLACE STL BRG MEMBER (SHOES)	CNC CRACK REPAIR (DISCRETE)(INJECT)	EXCAVATION (CHANNEL)	CL C CONC (PILE ENCASEMENT)	GABIONS (GALV)	GABION MATRESS (12 IN) (GALV)	CNC STR RPR (DECK REPAIR(FULL DEPTH))	CNC STR RPR (DECK REPAIR(PART DEPTH))	CNC STR RPR (PAN GIRDER HOLE RPR)	RAISING EXISTING STRUCTURE	REPLACE ELASTOMERIC BEARING PADS	EPOXY WATERPROOF FINISH
		CY	CY	CY	SF	LS	CY	CY	EA		LF	SF	EA	LF	CY	LF	CY	SY	SF	SF	SF	LS	EA	SF
23-042-1104-02-007	FM 1026/Draw	40																						
23-042-1104-01-010	FM 1026/Wildcat Creek																				32			80
23-068-1239-01-006	FM 1027/Draw		10		60				1						20									
23-042-1365-01-006	FM 1176/Draw								1						50									
23-042-1365-03-003	FM 1176/MukeWater Creek		20																					
23-025-1038-02-006	FM 1467/Blanket Creek											5												
23-047-1039-02-014	FM 1476/Leon River 014		3			1															168			360
23-047-1039-02-013	FM 1476/Leon River Relief		2	117																	128			640
23-047-1039-03-002	FM 1496/Cow Creek	25													1	5								
23-047-1039-01-016	FM 1702/Leon River 016			60																				
23-042-2006-01-007	FM 2134/Elm Creek		8																					
23-047-2703-01-001	FM 2318/Sabanna River			860																	48			240
23-047-2391-01-007	FM 2486/S Leon River		1	10																				
23-025-2377-01-006	FM 2524/Carnegie,Bnsf RR, etc.																			6				
23-206-2729-01-001	FM 2732/Wallace Creek		2																					
23-047-1659-04-001	FM 2823/Resley Creek	10	2	15																	24			120
23-047-3066-02-003	FM 2921/Leon River Tributary	14						7																
23-068-0007-14-013	FM 2945/Sandy Creek & UP RR		19		16					324		12												
23-167-0480-07-024	FM 45/Colorado River									385														
23-047-1029-04-007	FM 573/Draw	15		10																				
23-167-1028-01-004	FM 574/ Pecan Bayou			10	12	1									4	15					24			160
23-047-1039-01-007	FM 591/Mill Creek			10																				
23-047-1039-01-006	FM 591/West Joplin Creek	20		10	3																			
23-160-0870-06-032	FM 765/Deep Creek		8	15																	33			120
23-068-0550-01-019	FM 8/Ellison Creek		7				30								4	16								
23-068-0550-01-022	FM 8/Hog Creek 022						10														27			120
23-068-0550-01-021	FM 8/Leon River Tributary		20																		27			120
23-068-0007-04-167	IH 20 Eastbound/Colony Creek									176		10									42			120
23-068-0314-05-035	IH 20 Eastbound/Middle Creek	60																		10	32			120
23-068-0007-06-073	IH 20 Eastbound/Russell Creek 073									200		10												
23-068-0314-05-037	IH 20 Eastbound/S Fork Palo Pinto Creek 037			25						320		32							1000		91			280
23-068-0314-05-157	IH 20 S FR/S Fork Palo Pinto Crk 157		3	65																	56			280
23-068-0007-04-168	IH 20 S Frontage Road/Colony Creek											8									24			120
23-068-0314-05-036	IH 20 Westbound /S Fork Palo Pinto Creek 03									320		19									88			280
23-068-0007-06-072	IH 20 Westbound/Russell Creek 072											34												
23-068-0007-03-081	IH 20/CR 136													10										
23-042-0636-01-009	SH 153/N Prong Hords Creek		3		80																			
23-047-0289-01-044	SH 16/Draw 044		60											6										
23-047-0289-01-045	SH 16/Draw 045		4												30									
23-047-0288-01-021	SH 16/Sabanna River		167		32																160			640
23-068-0288-03-017	SH 16/Hog Creek		26																					
23-068-0288-03-013	SH 16/Indian Creek						50																	
23-206-0289-04-037	SH 16/Jerrys Creek	50			9																			
23-206-0289-04-048	SH 16/San Saba River		2																	9				
23-206-0289-04-047	SH 16/San Saba River Relief						30																	
23-042-0078-03-003	SH 206/Draw				4										15									
23-068-2638-01-008	SH 206/Love Creek	40	6																		36			120
23-042-0452-03-021	SH 206/Pecan Bayou		2		84	1				593											150			720
23-025-0480-04-011	SH 279/Holloway Creek											17												
23-025-0480-02-002	SH 279/Lake Brownwood											16	1											
23-025-0480-01-003	SH 279/Rocky Creek	10	1											8										
23-068-0452-01-018	SH 36/Draw 018						40																	
23-068-0452-01-019	SH 36/Draw 019	15																						
23-047-0183-01-027	SH 36/Salt Creek	10																						
23-047-0182-02-009	SH 36/Stagg Creek		10																					
23-047-0183-01-044	SH 36/Tatum Branch	10																						
23-047-0257-05-028	SH 6/Leon River				8	1				644												1	1	
23-215-0011-07-027	US 180/Hubbard Creek Relief	20	5																					
23-215-0404-02-024	US 183/Clear Frk Brazos River Relief		20		15																70			280
23-215-0404-02-017	US 183/Draw		2		30																56			160
23-215-0404-02-022	US 183/Givens Creek				15																60			240
23-215-0404-02-015	US 183/Hubbard Creek		1		4	1															70			320
23-206-0272-03-055	US 190/Flat Branch		6		4																			
23-206-0272-03-052	US 190/Harkey Slough		3		4					280														
23-206-0272-03-050	US 190/Hooten Hollow	20																						
23-025-0128-01-034	US 377/BNSF RR & CARNEGIE ST																			2				
23-042-0078-05-036	US 67/BNSF RR					1				784														
23-025-0054-07-030	US 67/Pecan Bayou						20			532	136	61		3	110		60	225						
23-042-0054-02-055	US 84/Drainage Ditch								1						30									
23-042-0054-04-018	US 84/Draw								1						25									
23-160-0070-06-036	US 87/Drain											12												
23-160-0071-02-067	US 87/San Saba River		2																					
	TOTALS	359	425	1207	380	6	180	7	4	4558	136	236	1	27	289	36	60	225	1000	27	1446	1	1	5640

BRIDGE SUMMARY

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		13

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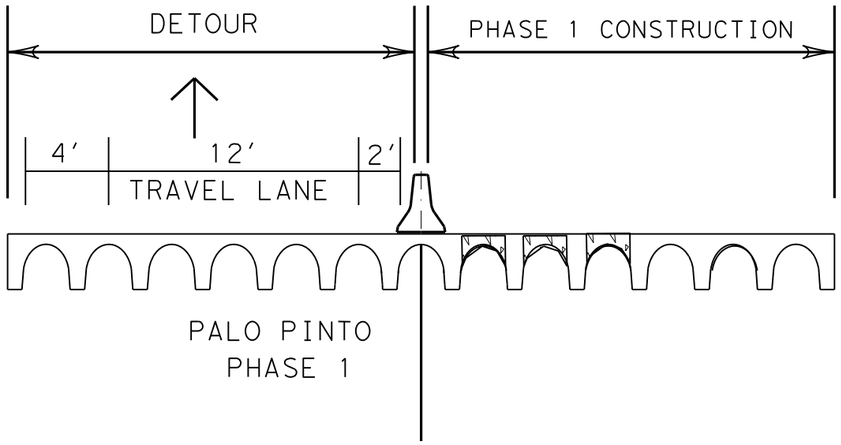
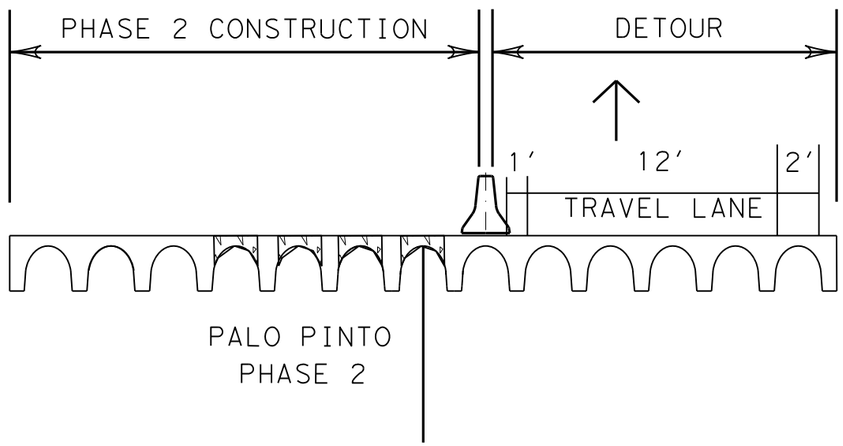


PHASE 1 TYPICAL SECTION



PHASE 2 TYPICAL SECTION

09/03/2021

IH 20 EB @
S FORK PALO
PINTO CREEK
230680031405037
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		14

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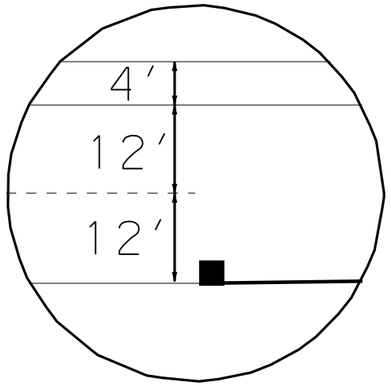
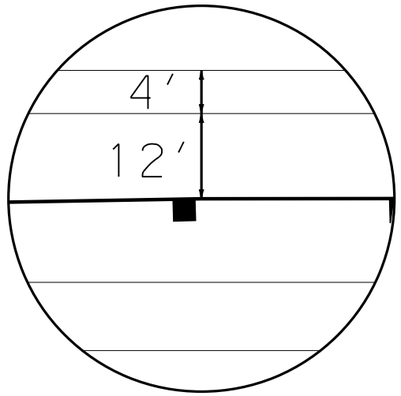


INSET A



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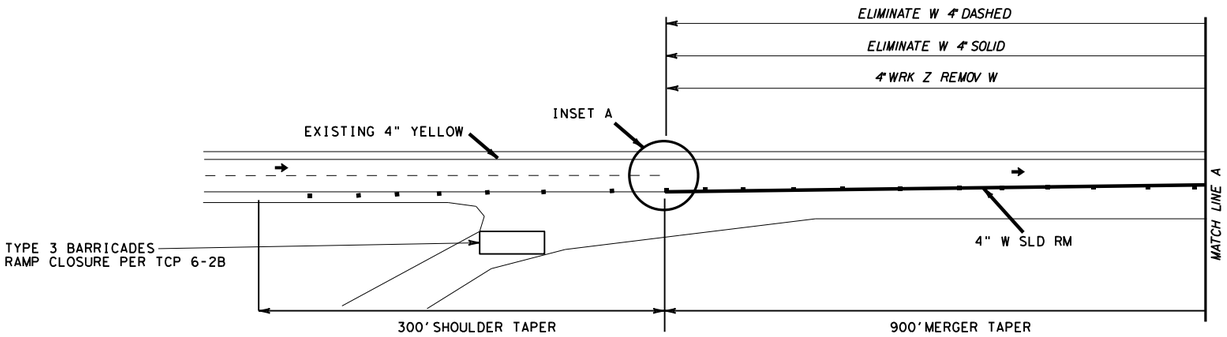
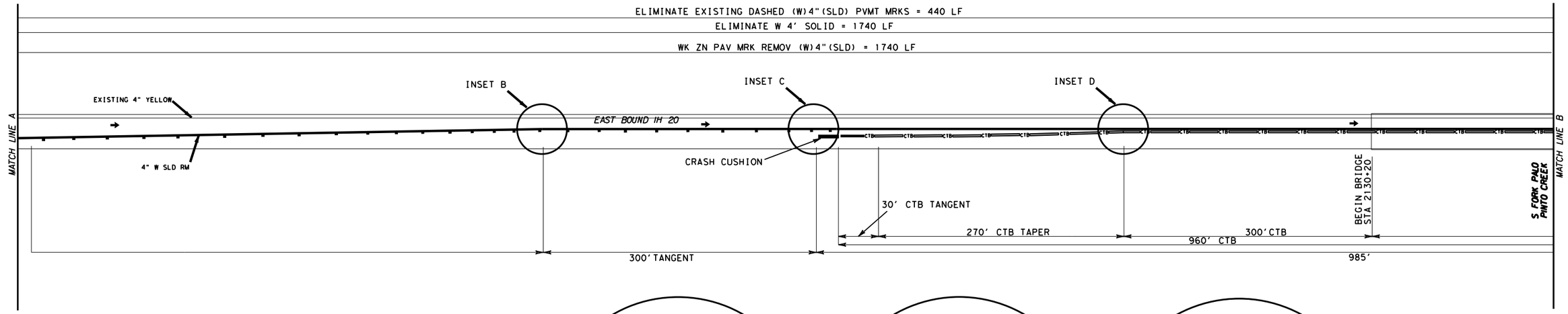
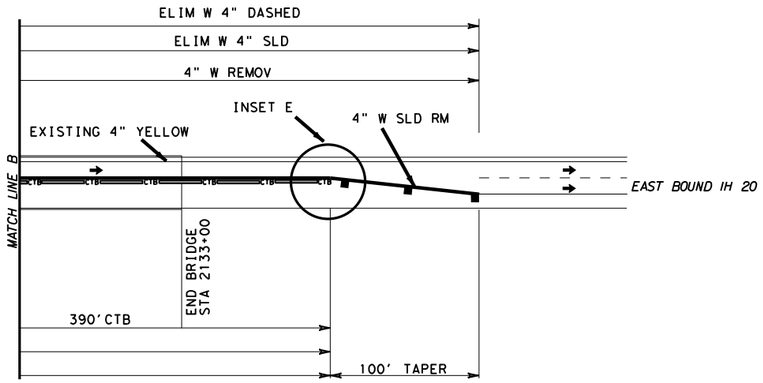
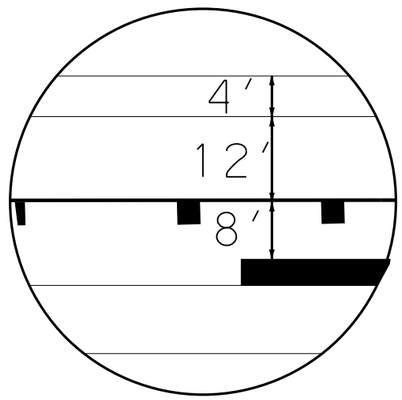




LEGEND

EXISTING PAVEMENT MARKINGS
CHANNELIZING DEVICES & WK ZN PAVEMENT MARKINGS
CHANNELIZING DEVICES
CONCRETE TRAFFIC BARRIER





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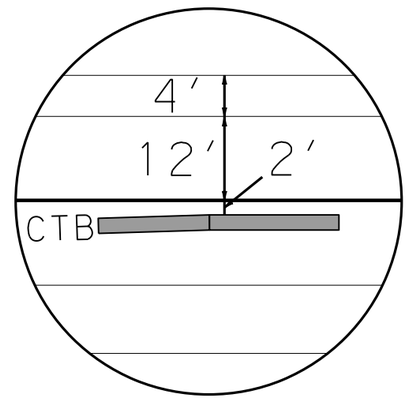

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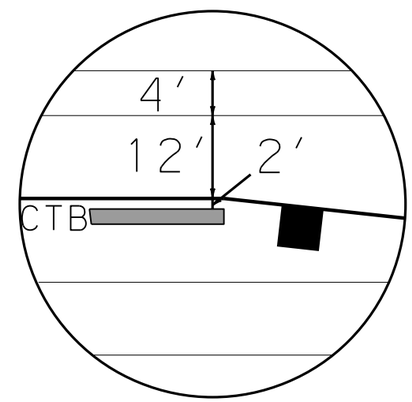

INSET E

REFER TO TCP (2-6)-18 FOR REQUIRED SIGNS, SIGN/DEVICE SPACING, & ADD'L INFORMATION.

NOTE:1 PORTABLE CHANGING MESSAGE BOARD IS ESTIMATED AND SHALL BE USED AS DIRECTED BY THE ENGINEER.

RAISED PAVEMENT MARKERS SHALL BE USED TO SIMULATE WORK ZONE PAVEMENT MARKINGS AND SHALL BE PAID FOR BY THE LINEAR FOOT OF STRIPE REFER TO BC(12)-21.

ITEM	CODE	DESCRIPTION	UNIT	EST.
512	6013	PORT CTB(DES SOURCE)(SGL SLP)(TY 1)	LF	960
545	6019	CRASH CUSH ATTEN(INSTL)(S)(N)(TL3)	EA	1
662	6057	WK ZN PAV MRK REMOV(TRAF BTN)TY W	LF	1740
677	6001	ELIM EXT PAV MRK & MRKS(4")	LF	2180

09/03/2021

IH 20 EB @ S FORK PALO PINTO CREEK 230680031405037 EASTLAND CO.

PHASE I

PALO PINTO CREEK

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		15

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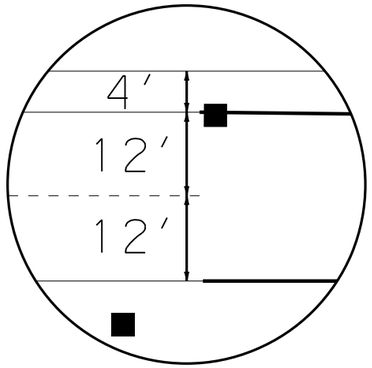
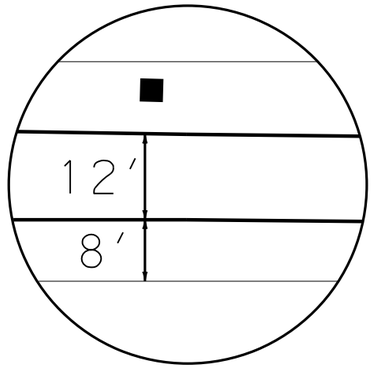


INSET A



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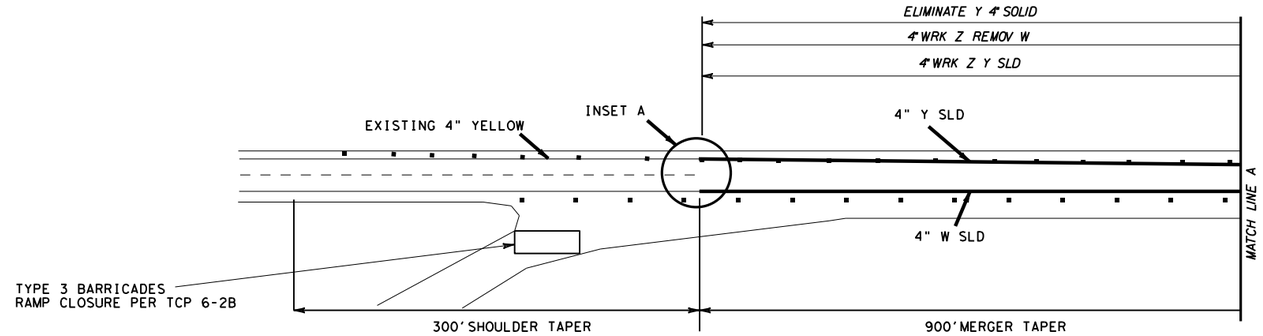
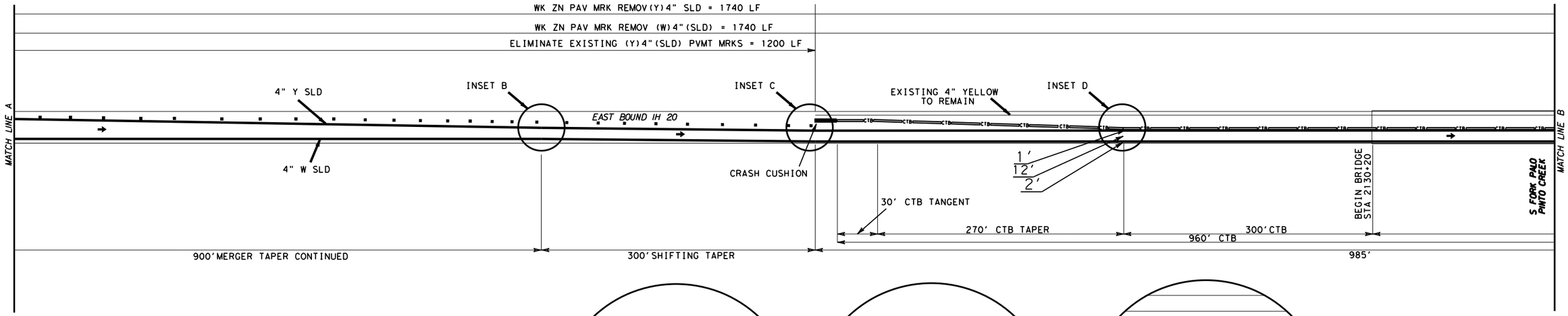
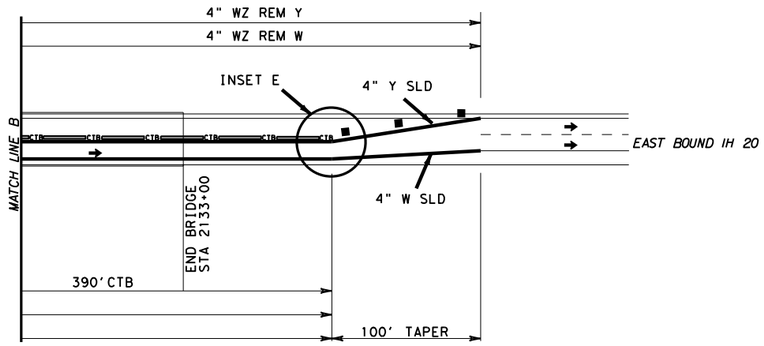
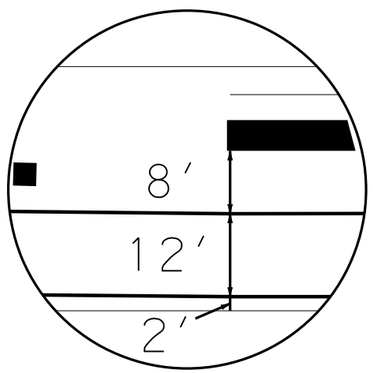




LEGEND

EXISTING PAVEMENT MARKINGS
CHANNELIZING DEVICES & WK ZN PAVEMENT MARKINGS
CHANNELIZING DEVICES
CTB CTB CONCRETE TRAFFIC BARRIER





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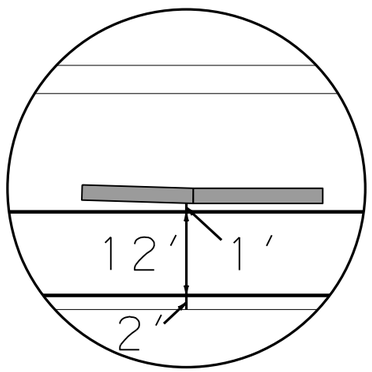

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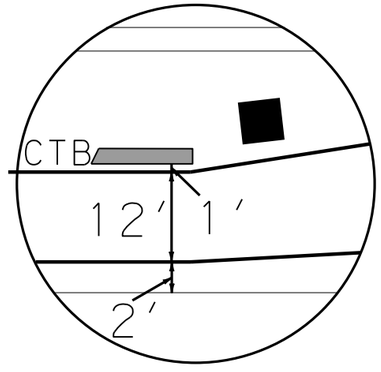

INSET E

REFER TO TCP (2-6)-18 FOR REQUIRED SIGNS, SIGN/DEVICE SPACING, & ADD'L INFORMATION.

NOTE:1 PORTABLE CHANGING MESSAGE BOARD IS ESTIMATED AND SHALL BE USED AS DIRECTED BY THE ENGINEER.

RAISED PAVEMENT MARKERS SHALL BE USED TO SIMULATE WORK ZONE PAVEMENT MARKINGS AND SHALL BE PAID FOR BY THE LINEAR FOOT OF STRIPE REFER TO BC(12)-21.

PLACE PM IN ORIGINAL CONFIGURATION UPON REMOVAL OF CTB.

ITEM	CODE	DESCRIPTION	UNIT	EST.
512	6025	PORT CTB (MOVE)(SGL)(SLP)(TY1)	LF	960
512	6049	PORT CTB(REMOVE)(SGL SLP)(TY1)	LF	960
545	6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	1
545	6005	CRASH CUSH ATTEN(REMOVE)	EA	1
662	6057	WK ZN PAV MRK REMOV(TRAF BTN)TY W	LF	1740
662	6059	WK ZN PAV MRK REMOV(TRAF BTN) TY Y	LF	1740
666	6300	RE PM W/RET REQ TY I(W4")(BRK)(100MIL)		440
666	6303	RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	LF	1740
666	6315	RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	LF	1740
672	6010	REFL PAV MRKR TY II-C-R	EA	18
677	6001	ELIM EXT PAV MRK & MRKS(4")	LF	1200

JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

09/03/2021

IH 20 EB @
S FORK PALO
PINTO CREEK
230680031405037
EASTLAND CO.

PHASE 2

PALO PINTO CREEK

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		16

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LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	1	15	IH 20 EB @ PALO PINTO	2124+20	3	UNI	ASPH		PCTB (SSCB)	24"	42"		X								X	
1	2	16	IH 20 EB @ PALO PINTO	2124+20	3	UNI	ASPH		PCTB (SSCB)	24"	42"			X	X	1					X	
												TOTALS										

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		
	BWD	COMANCHE, ETC.		
				SHEET NO.
				16A

Bridge Structure ID	Bridge Description	TRAFFIC CONTROL PLAN	TMA STATIONARY (DAY)	PORTABLE CHANGEABLE MESSAGE BOARD (DAY)
23-042-1104-02-007	FM 1026/Draw	TCP (1-1A)	1	
23-042-1104-02-010	FM 1026/Wildcat Creek	TCP (1-2B)	2	
23-068-1239-01-006	FM 1027/Draw	TCP (1-1A)	2	
23-042-1365-01-006	FM 1176/Draw	TCP (1-1A)	2	
23-042-1365-03-003	FM 1176/MukeWater Creek	TCP (1-1A)	1	
23-025-1038-02-006	FM 1467/Blanket Creek	TCP (1-1A)	1	
23-047-1039-02-014	FM 1476/Leon River 014	TCP (1-1A), TCP (1-2B)	3	
23-047-1039-02-013	FM 1476/Leon River Relief	TCP (1-1A), TCP (1-2B)	4	
23-047-1039-03-002	FM 1496/Cow Creek	TCP (1-1A)	1	
23-047-1039-01-016	FM 1702/Leon River 016	TCP (1-1A)	1	
23-042-2006-01-007	FM 2134/Elm Creek	TCP (1-1A)	1	
23-047-2703-01-001	FM 2318/Sabanna River	TCP (1-1A), TCP (1-2B)	3	
23-047-2391-01-007	FM 2486/S Leon River	TCP (1-1A)	1	
23-025-2377-01-006	FM 2524/Carnegie,Bnsf RR, etc.	TCP (2-4A)	1	
23-206-2729-01-001	FM 2732/Wallace Creek	TCP (1-1A)	1	
23-047-1659-04-001	FM 2823/Resley Creek	TCP (1-1A), TCP (1-2B)	3	
23-047-3066-02-003	FM 2921/Leon River Tributary	TCP (1-1A)	1	
23-068-0007-14-013	FM 2945/Sandy Creek & UP RR	TCP (1-1A), TCP (1-2B)	4	
23-167-0480-07-024	FM 45/Colorado River	TCP (1-2B)	3	
23-047-1029-04-007	FM 573/Draw	TCP (1-1A)	1	
23-167-1028-01-004	FM 574/ Pecan Bayou	TCP (1-1A), TCP (1-2B)	5	
23-047-1039-01-007	FM 591/Mill Creek	TCP (1-1A)	1	
23-047-1039-01-006	FM 591/West Joplin Creek	TCP (1-1A)	1	
23-160-0870-06-032	FM 765/Deep Creek	TCP (1-1A), TCP (1-2B)	3	
23-068-0550-01-019	FM 8/Ellison Creek	TCP (1-1A)	3	
23-068-0550-01-022	FM 8/Hog Creek 022	TCP (1-1A), TCP (1-2B)	3	
23-068-0550-01-021	FM 8/Leon River Tributary	TCP (1-1A), TCP (1-2B)	3	
23-068-0007-04-167	IH 20 Eastbound/Colony Creek	TCP (1-1A), TCP (6-1A)	3	2
23-068-0314-05-035	IH 20 Eastbound/Middle Creek	TCP (1-1A), TCP (6-1A)	2	2
23-068-0007-06-073	IH 20 Eastbound/Russell Creek 073	TCP (1-1A), TCP (6-1A)	2	2
23-068-0314-05-037	IH 20 Eastbound/S Fork Palo Pinto Creek 037	SEE TCP LAYOUT	17	30
23-068-0314-05-157	IH 20 S FR/S Fork Palo Pinto Crk 157	TCP (1-1A), TCP (1-2B)	3	
23-068-0007-04-168	IH 20 S Frontage Road/Colony Creek	TCP (1-1A), TCP (1-2B)	3	
23-068-0314-05-036	IH 20 Westbound /S Fork Palo Pinto Creek 03	TCP (1-1A), TCP (6-1A)	3	3
23-068-0007-06-072	IH 20 Westbound/Russell Creek 072	TCP (1-1A)	1	
23-068-0007-03-081	IH 20/CR 136	TCP (1-1A)	1	
23-042-0636-01-009	SH 153/N Prong Hords Creek	TCP (1-1A)	3	
23-047-0289-01-044	SH 16/Draw 044	TCP (1-1A)	2	
23-047-0289-01-045	SH 16/Draw 045	TCP (1-1A)	1	
23-047-0288-01-021	SH 16/Sabanna River	TCP (2-8B)	17	60
23-068-0288-03-017	SH 16/Hog Creek	TCP (1-1A)	1	
23-068-0288-03-013	SH 16/Indian Creek	TCP (1-1A)	1	
23-206-0289-04-037	SH 16/Jerrys Creek	TCP (1-1A)	2	
23-206-0289-04-048	SH 16/San Saba River	TCP(2-3A)	3	6
23-206-0289-04-047	SH 16/San Saba River Relief	TCP (1-1A)	1	
23-042-0078-03-003	SH 206/Draw	TCP (1-1A)	1	
23-068-2638-01-008	SH 206/Love Creek	TCP (1-2B)	3	
23-042-0452-03-021	SH 206/Pecan Bayou	TCP (2-8B)	17	60
23-025-0480-04-011	SH 279/Holloway Creek	TCP (1-1A)	3	
23-025-0480-02-002	SH 279/Lake Brownwood	TCP (1-1A)	5	
23-025-0480-01-003	SH 279/Rocky Creek	TCP (1-1A)	2	
23-068-0452-01-018	SH 36/Draw 018	TCP (1-1A)	1	
23-068-0452-01-019	SH 36/Draw 019	TCP (1-1A)	1	
23-047-0183-01-027	SH 36/Salt Creek	TCP (1-1A)	1	
23-047-0182-02-009	SH 36/Stagg Creek	TCP (1-1A)	1	
23-047-0183-01-044	SH 36/Tatum Branch	TCP (1-1A)	1	
23-047-0257-05-028	SH 6/Leon River	TCP (1-1A), TCP (1-2B)	5	
23-215-0011-07-027	US 180/Hubbard Creek Relief	TCP (1-1A)	1	
23-215-0404-02-024	US 183/Clear Frk Brazos River Relief	TCP (1-1A), TCP (1-2B)	3	
23-215-0404-02-017	US 183/Draw	TCP (1-1A), TCP (1-2B)	3	
23-215-0404-02-022	US 183/Givens Creek	TCP (1-1A), TCP (1-2B)	3	
23-215-0404-02-015	US 183/Hubbard Creek	TCP (1-1A), TCP (1-2B)	3	
23-206-0272-03-055	US 190/Flat Branch	TCP (1-1A)	1	
23-206-0272-03-052	US 190/Harkey Slough	TCP (1-1A), TCP (1-2B)	2	
23-206-0272-03-050	US 190/Hooten Hollow	TCP (1-1A)	1	
23-025-0128-01-034	US 377/BNSF RR & CARNEGIE ST	TCP (2-4A)	1	
23-042-0078-05-036	US 67/BNSF RR	TCP (1-1A), TCP (1-2B)	2	
23-025-0054-07-030	US 67/Pecan Bayou	TCP (1-1A), TCP (1-2B)	5	
23-042-0054-02-055	US 84/Drainage Ditch	TCP (1-1A)	1	
23-042-0054-04-018	US 84/Draw	TCP (1-1A)	1	
23-160-0070-06-036	US 87/Drain	TCP (1-1A)	1	
23-160-0071-02-067	US 87/San Saba River	TCP (1-1A)	1	
	TOTALS		**192**	**165**

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS, P.E.

09/07/2021

TCP SUMMARY

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		17

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	BWD	COMANCHE,ETC.		18
5-10 5-21				

DATE: 8/18/2021 4:31:45 PM
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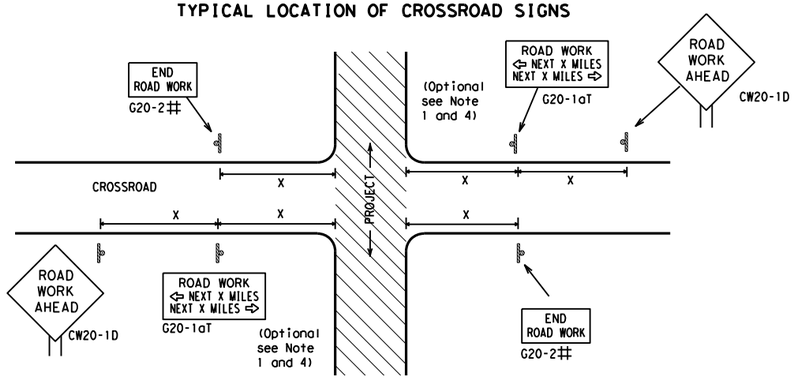
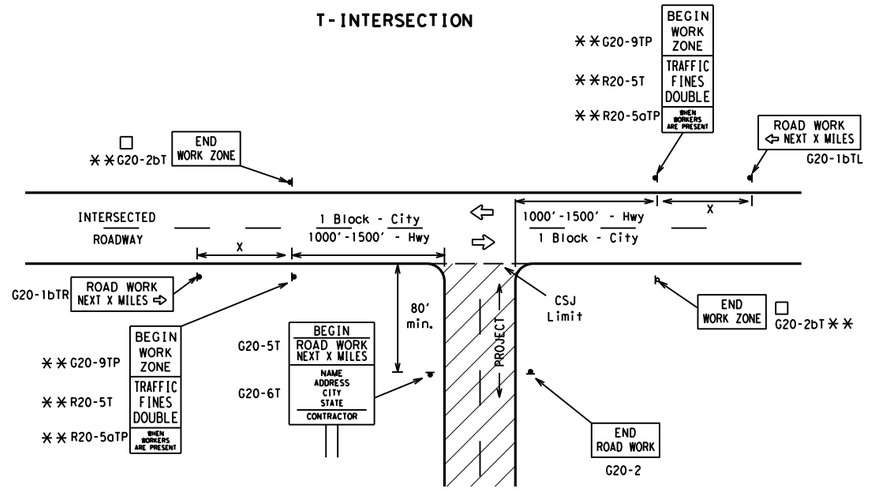
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

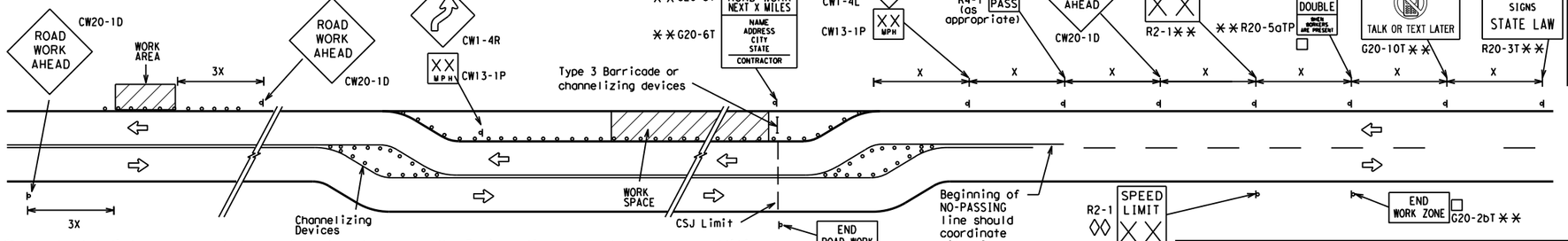
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

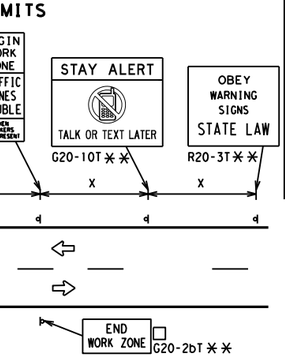
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

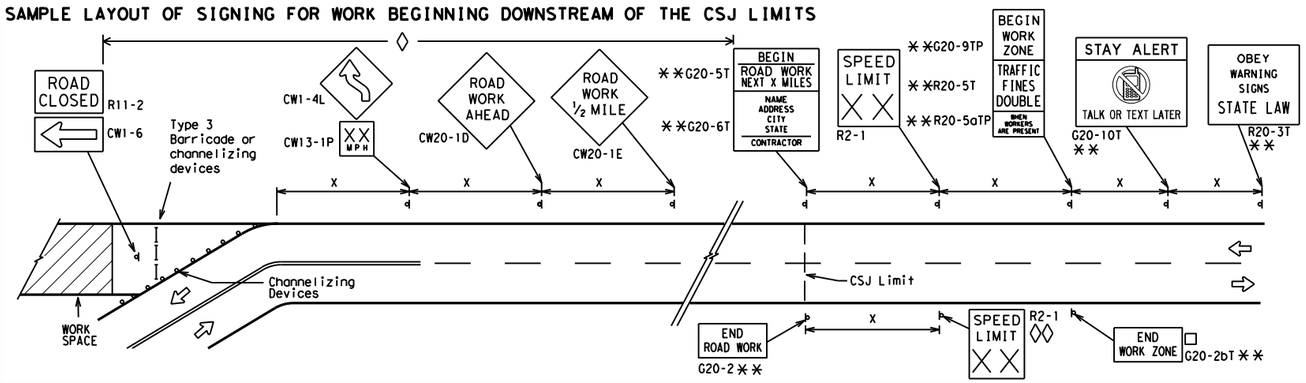


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

⊢⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0288	01	039,etc.	SH 16,etc.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		19

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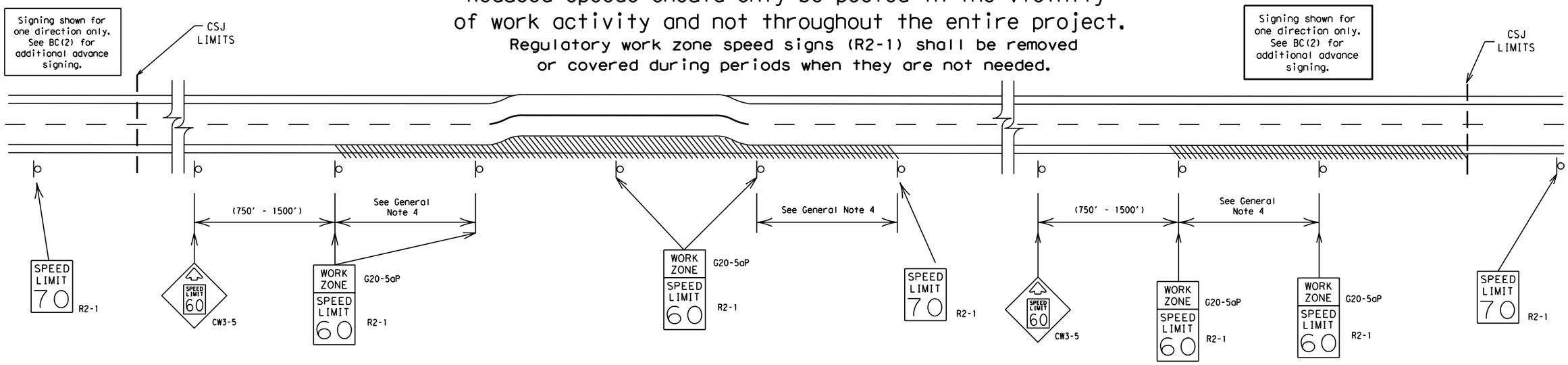
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		20

DATE: 8/18/2021 4:31:47 PM
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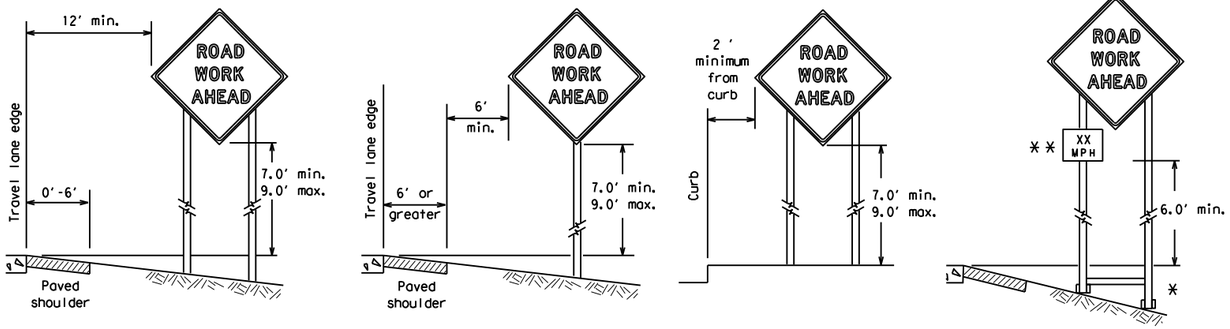
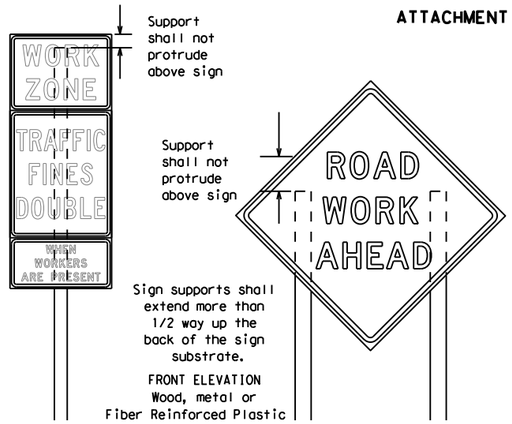
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

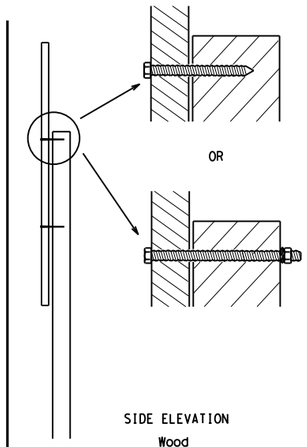


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





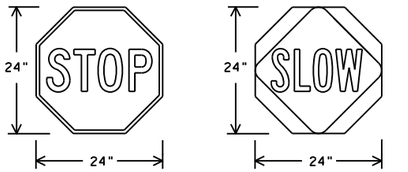
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		21

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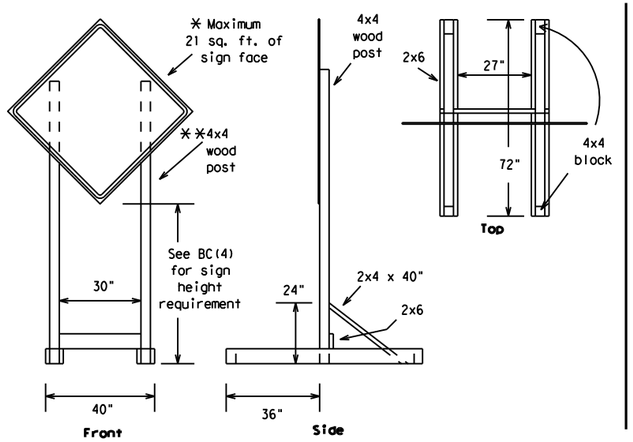
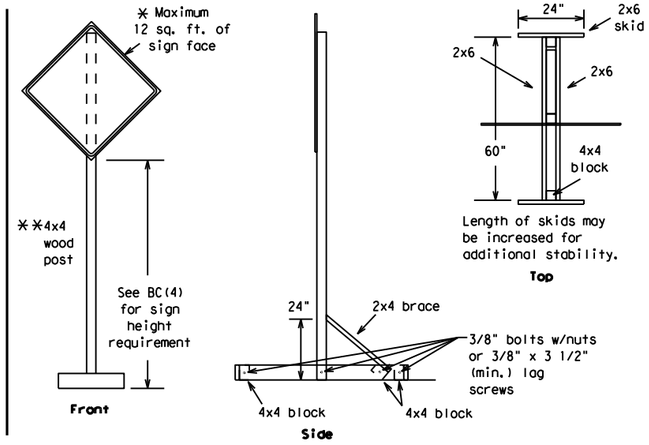
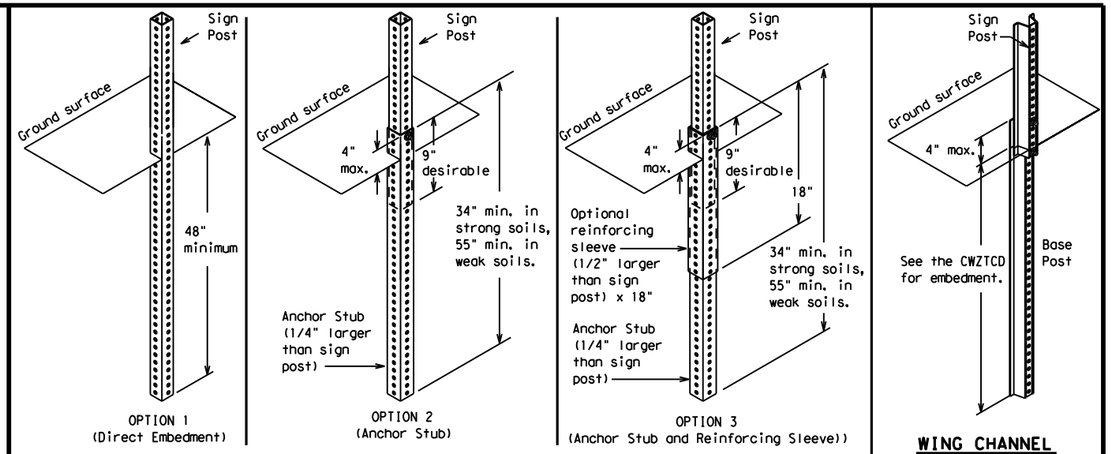




SKID MOUNTED WOOD SIGN SUPPORTS

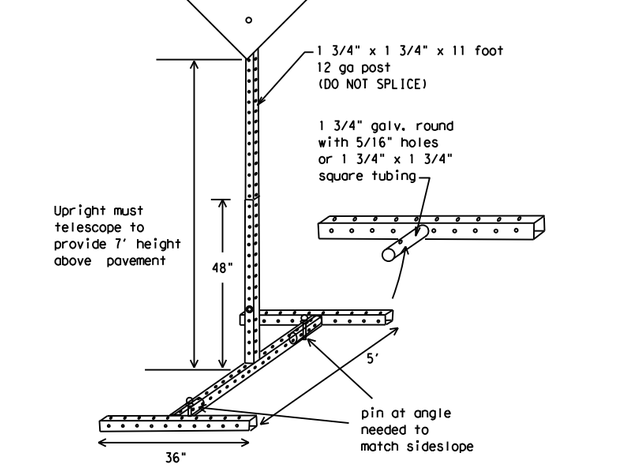
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

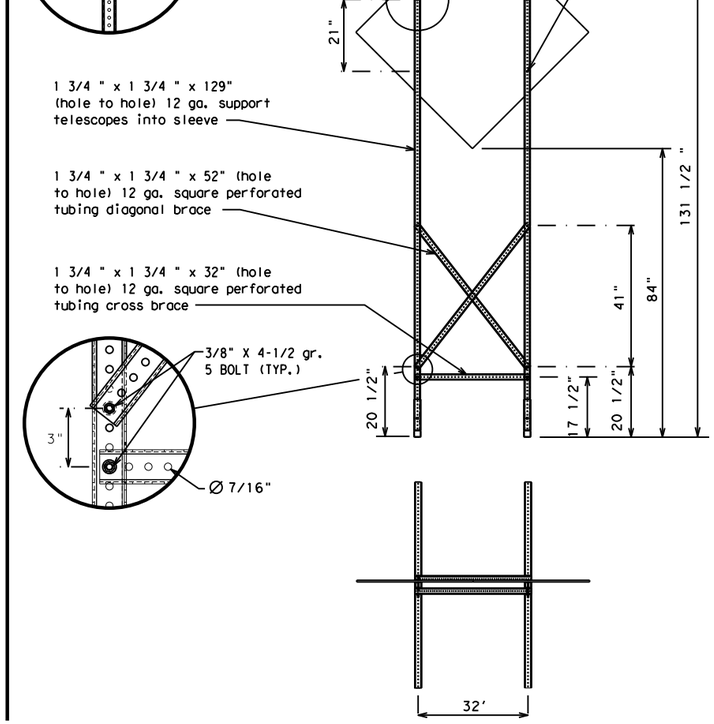


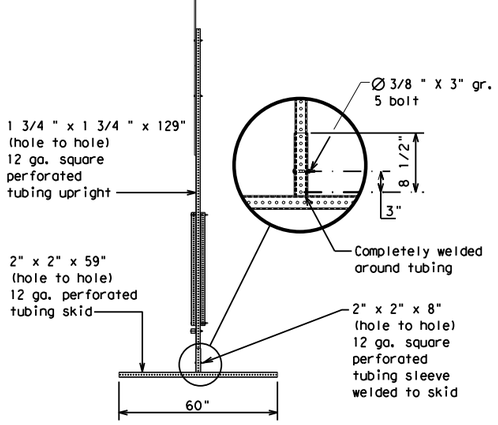
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		22

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation * IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM- X PM
APR XX- XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM- XX AM

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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7-13 5-21	BWD	COMANCHE,ETC.		23

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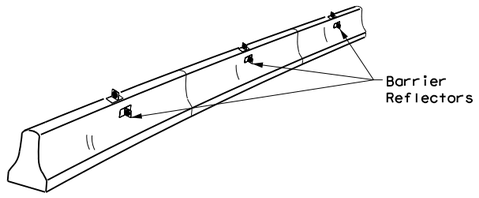
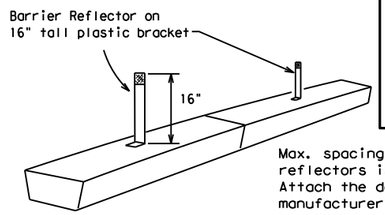
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

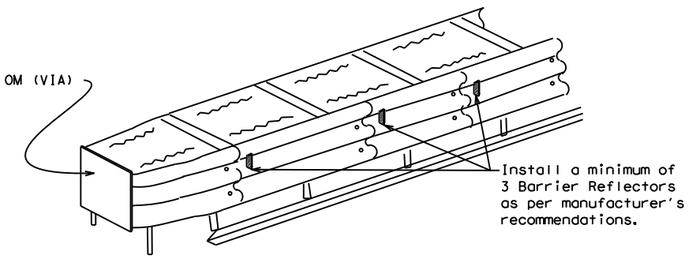


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)

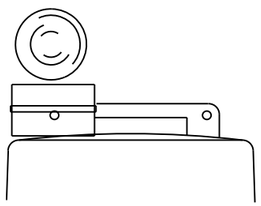


DELINEATION OF END TREATMENTS

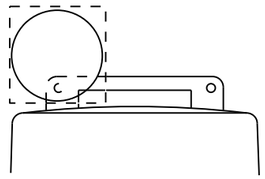
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

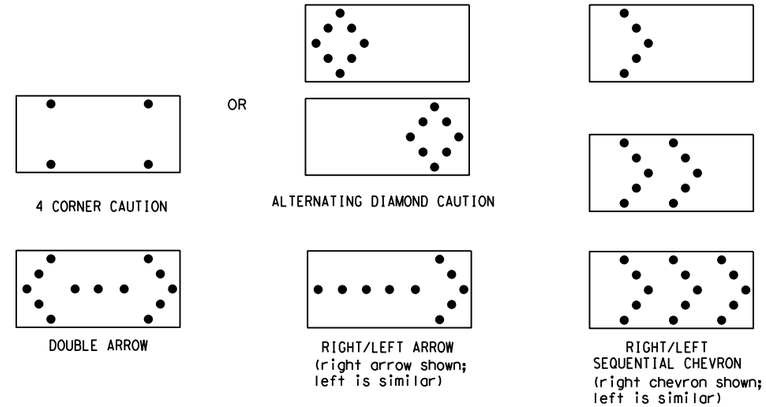
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		24

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

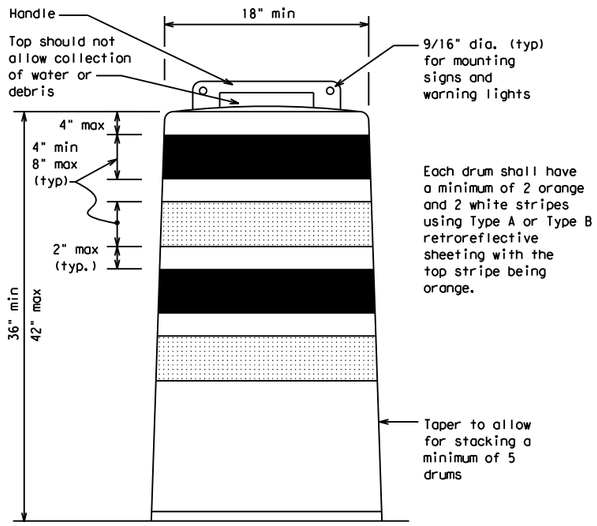
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

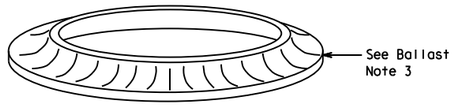
RETROREFLECTIVE SHEETING

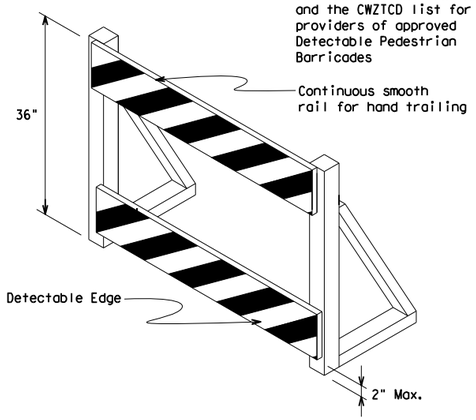
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

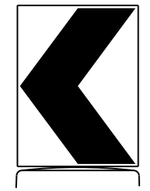




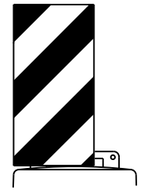


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	BWD	COMANCHE, ETC.		25
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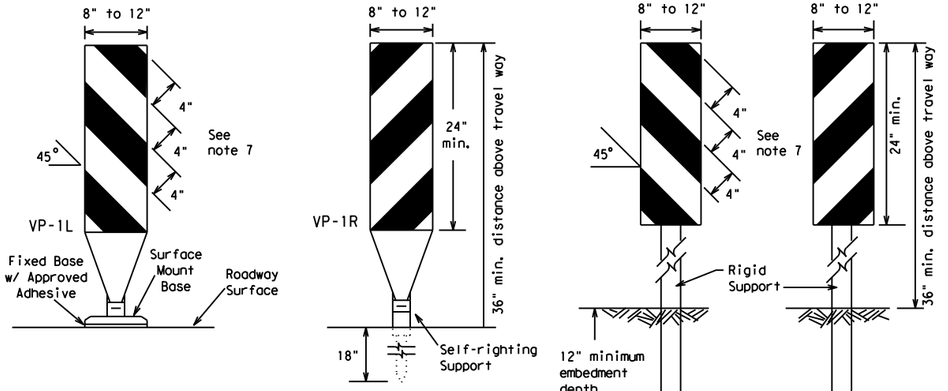
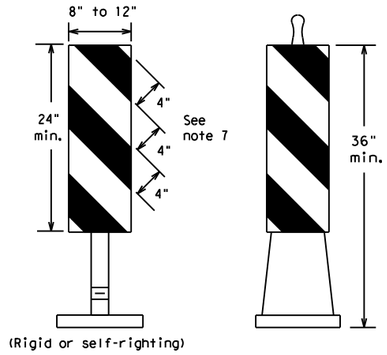


FIXED
(Rigid or self-righting)

DRIVEABLE

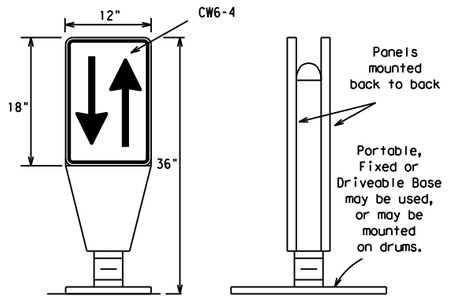


(Rigid or self-righting)

PORTABLE

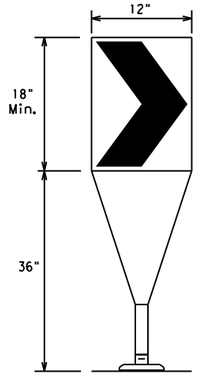
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



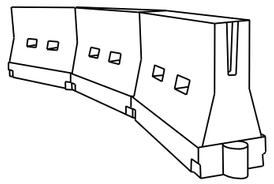
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COMANCHE,ETC.		26

DATE: 8/18/2021 4:31:52 PM
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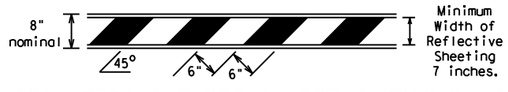
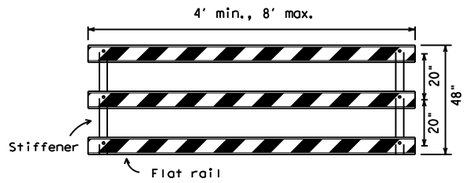
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



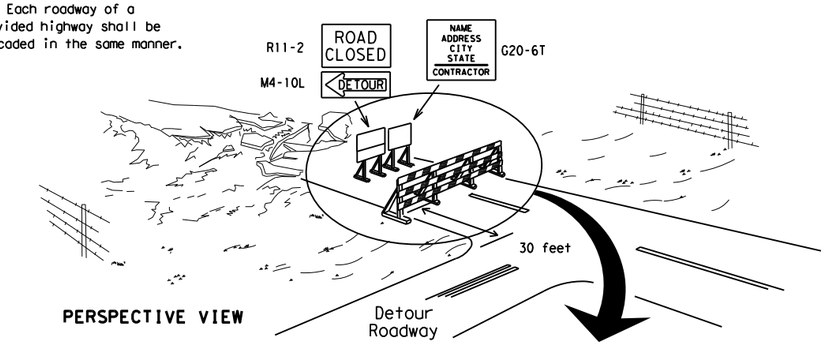
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

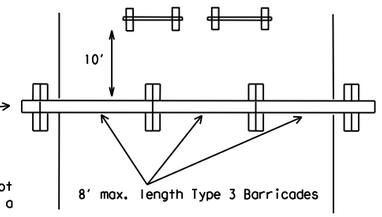
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

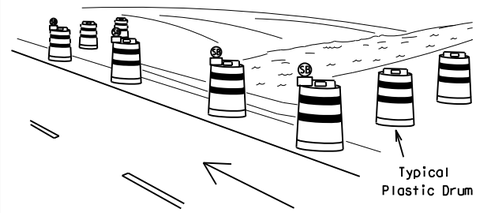
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

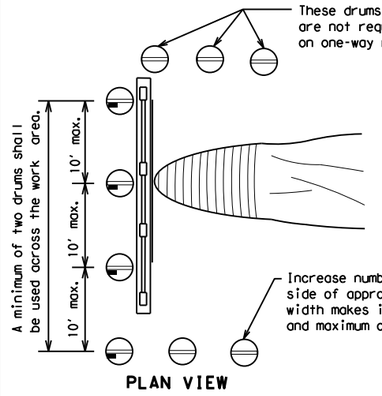
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

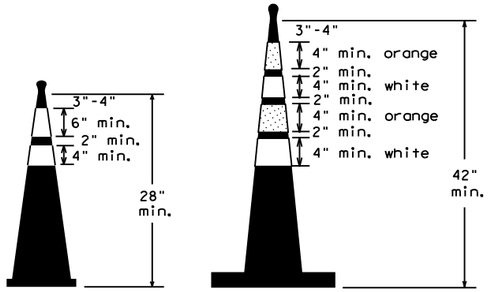
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



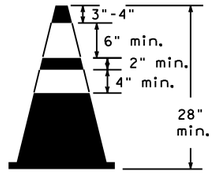
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

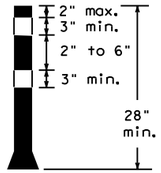
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

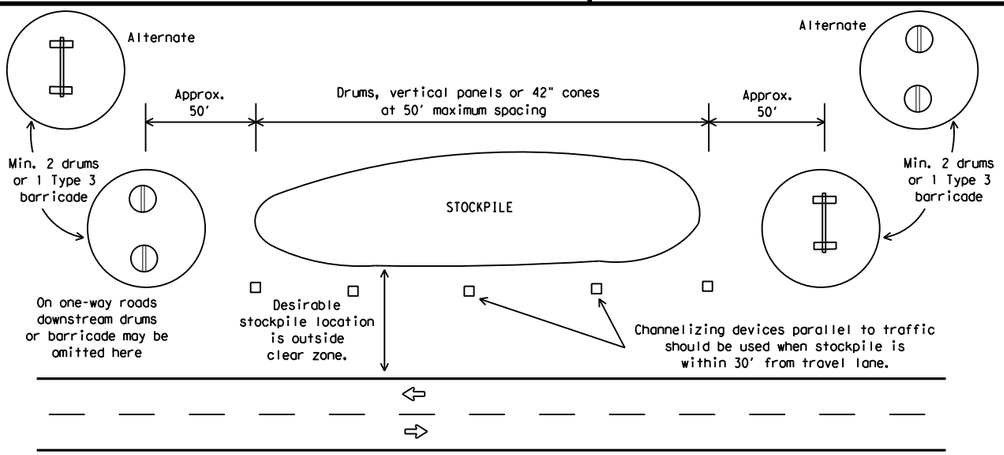


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13 5-21	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		27

104

DATE: 8/18/2021 4:31:53 PM
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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

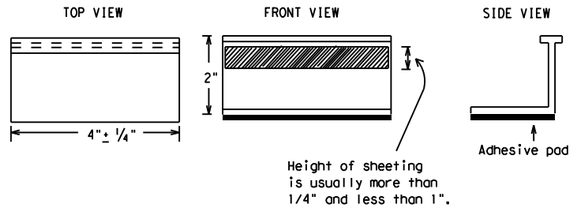
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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REVISIONS	0288	01	039,etc.	SH 16,etc.
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	BWD	COMANCHE,ETC.		28
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DATE: 8/18/2021 4:31:53 PM
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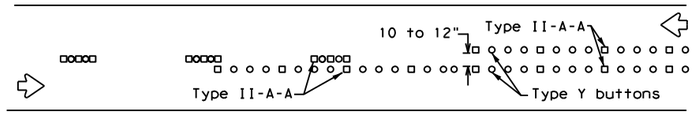
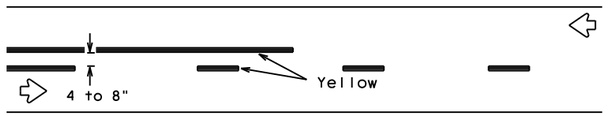
PAVEMENT MARKING PATTERNS

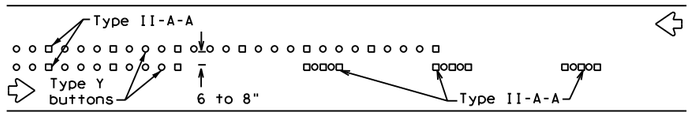
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



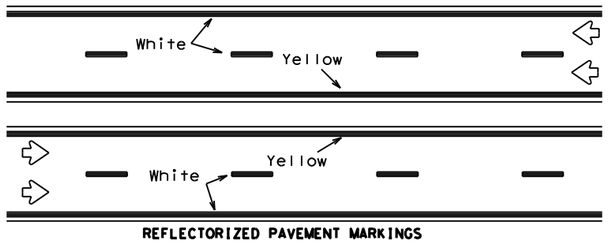
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



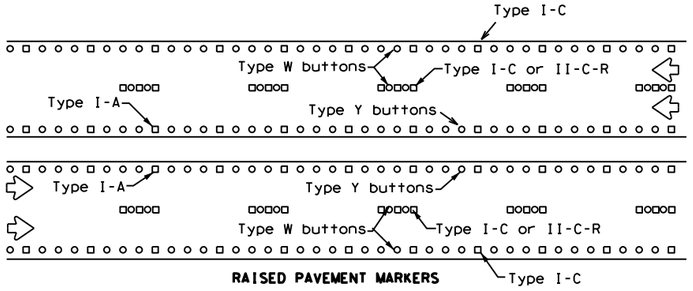
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



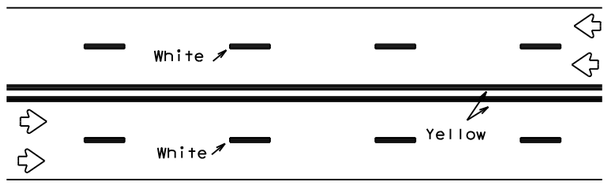
REFLECTORIZED PAVEMENT MARKINGS



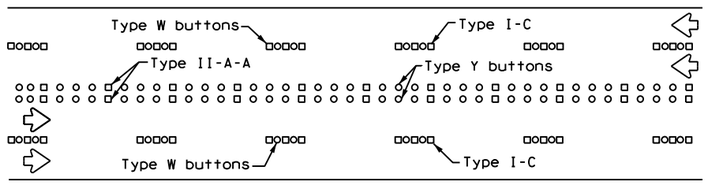
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



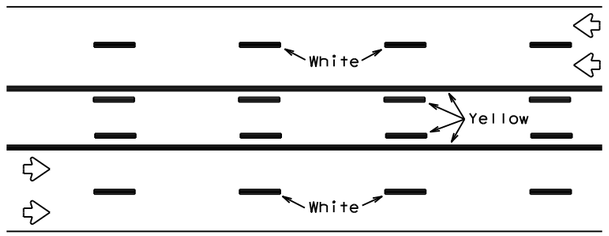
REFLECTORIZED PAVEMENT MARKINGS



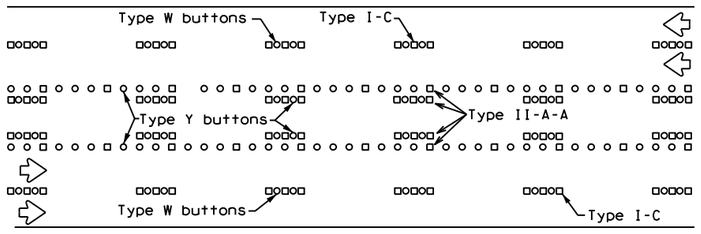
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

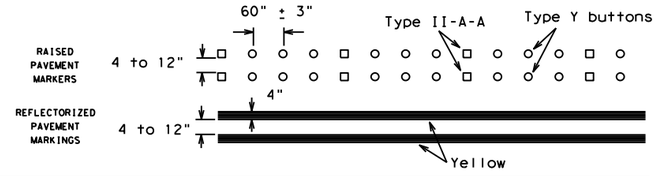
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

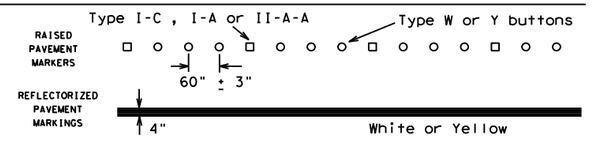
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

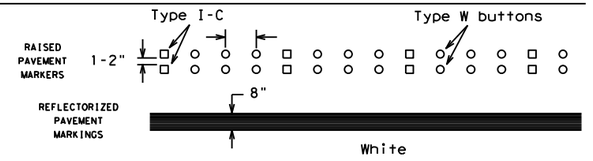


EDGE LINE OR SINGLE NO-PASSING LINE



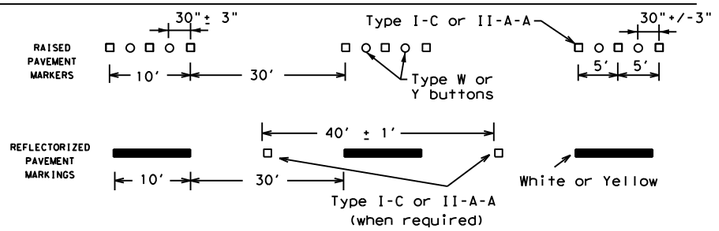
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

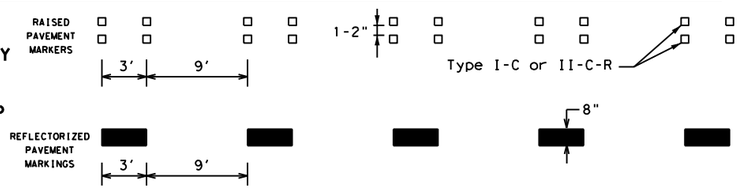


BROKEN LINES

CENTER LINE OR LANE LINE

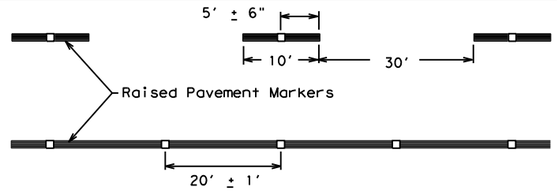


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

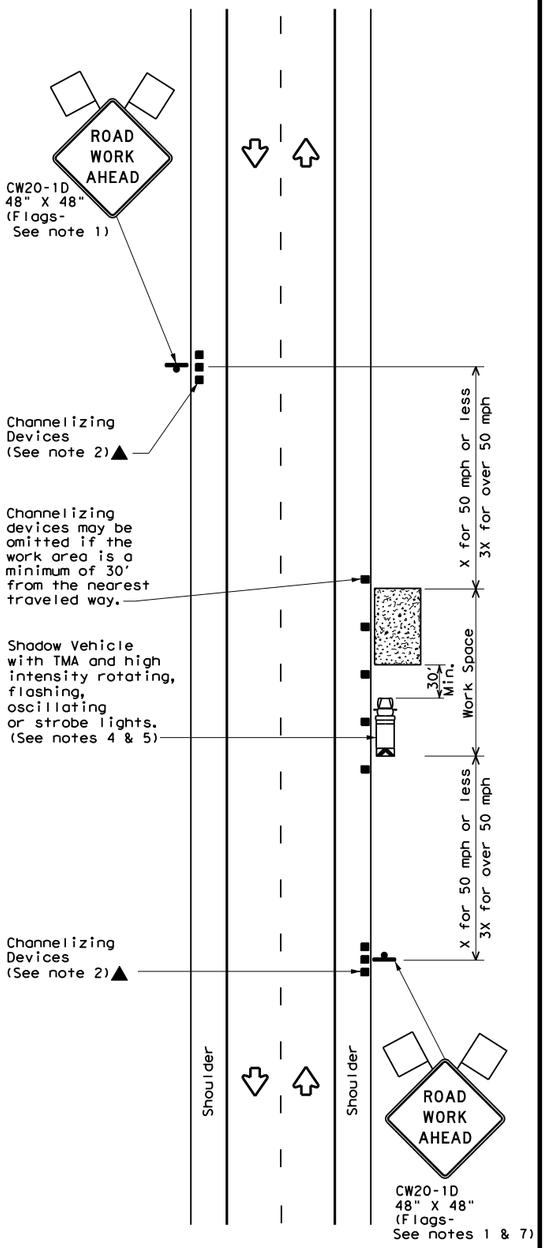
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

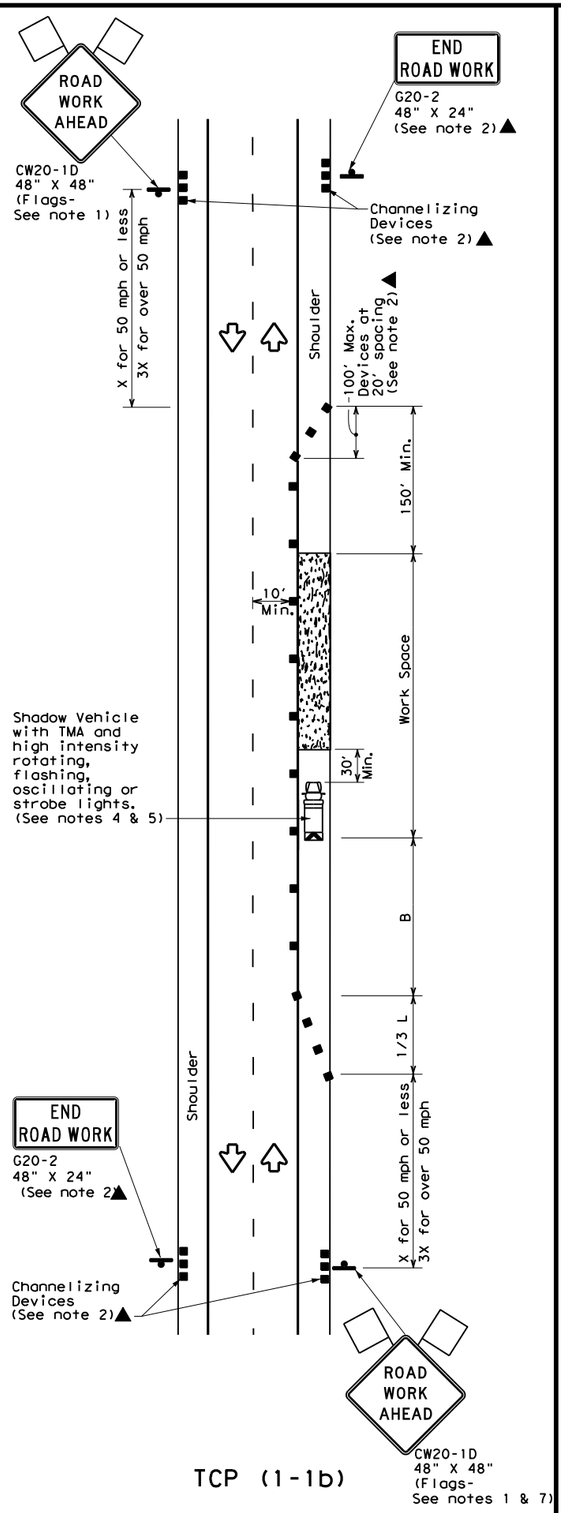
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	BWD	COMANCHE,ETC.		29
11-02 8-14				

DATE:
FILE:



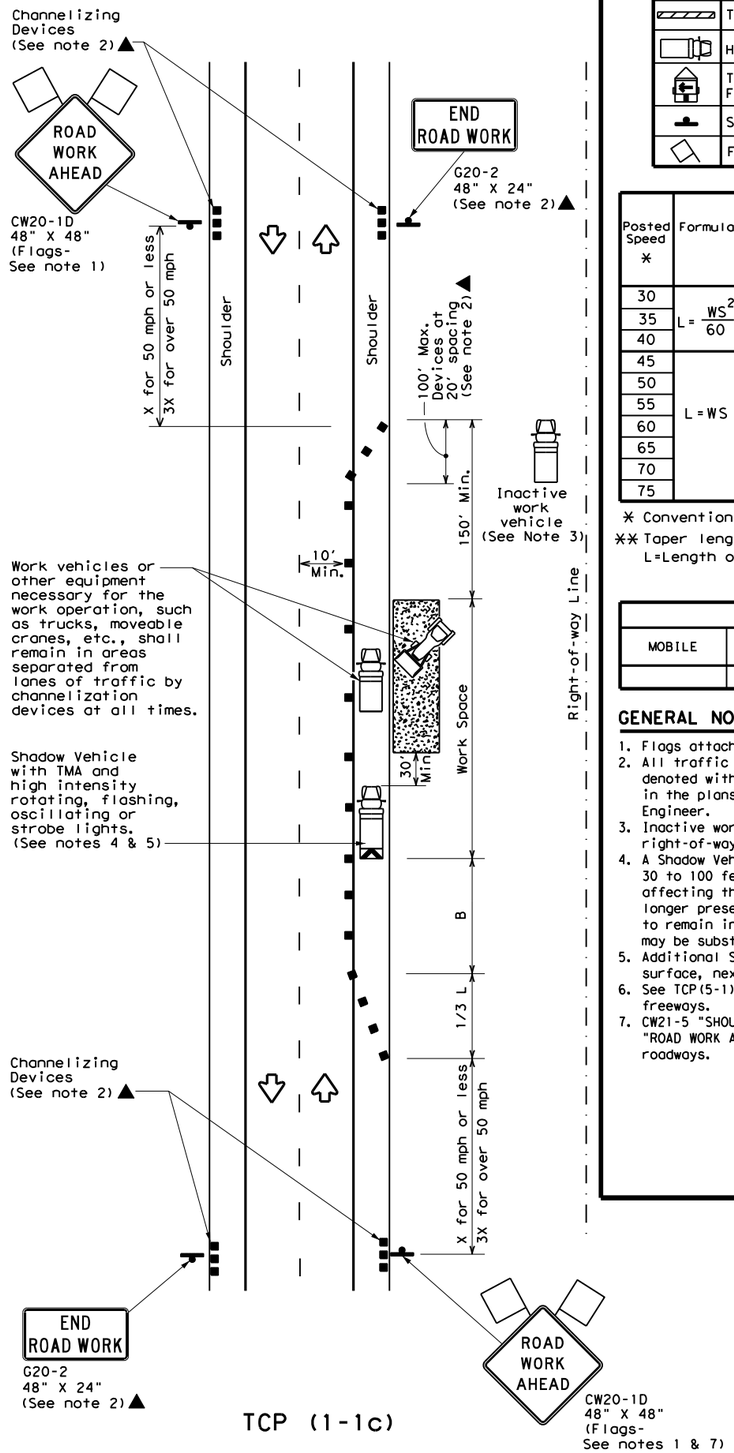
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0288	01	039,etc.	SH 16,etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE,ETC.		30

DATE:
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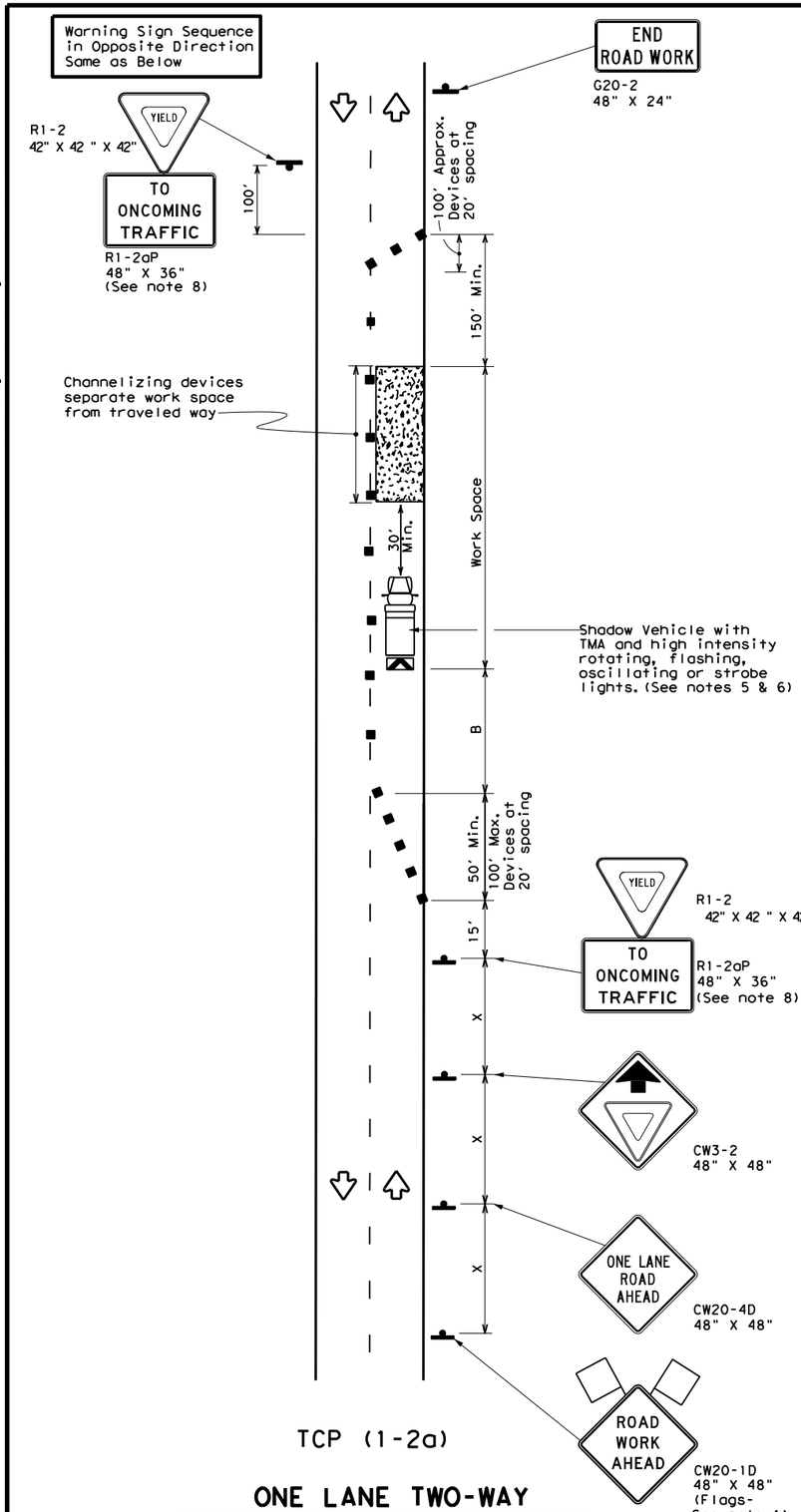
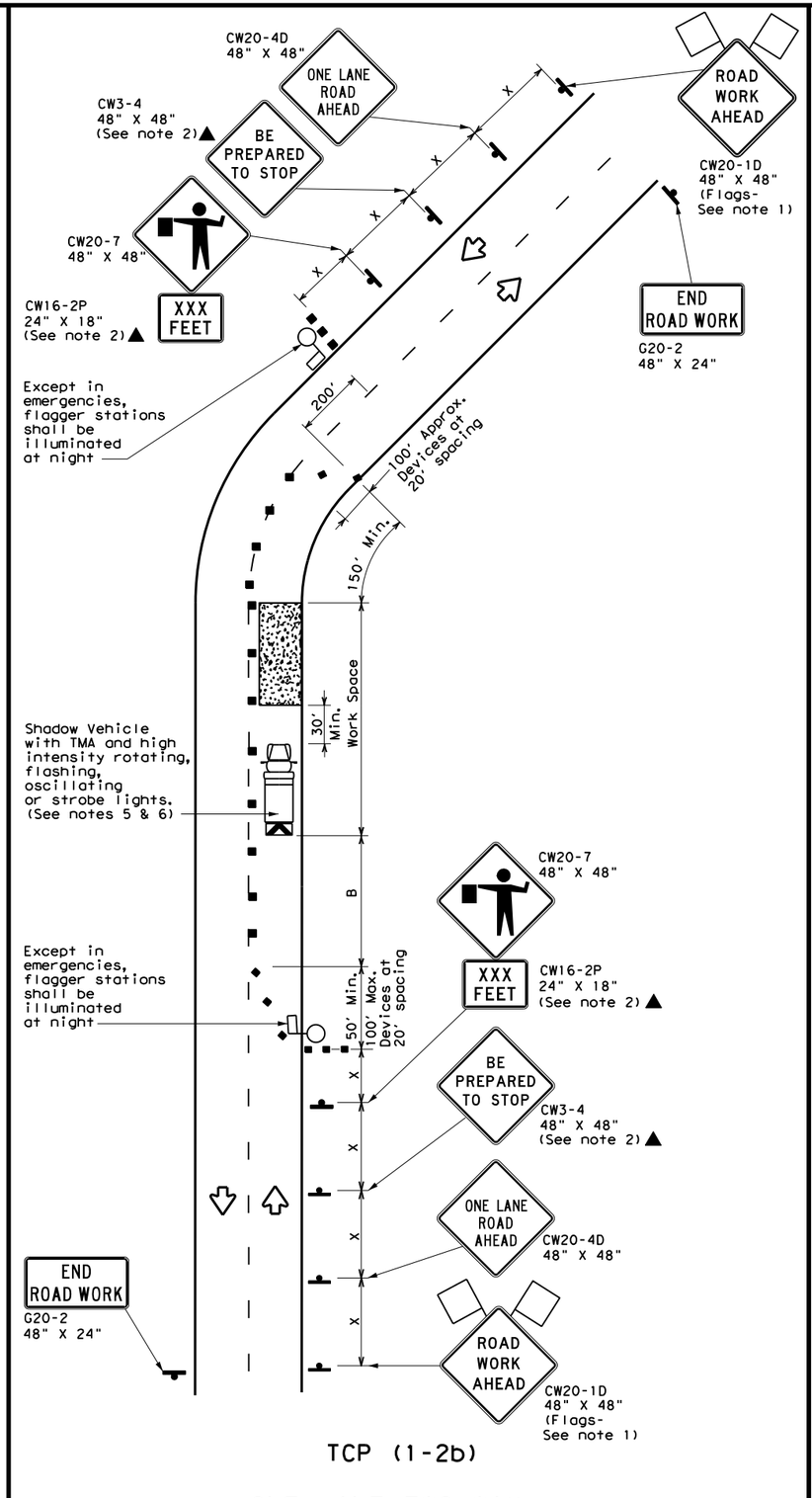


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

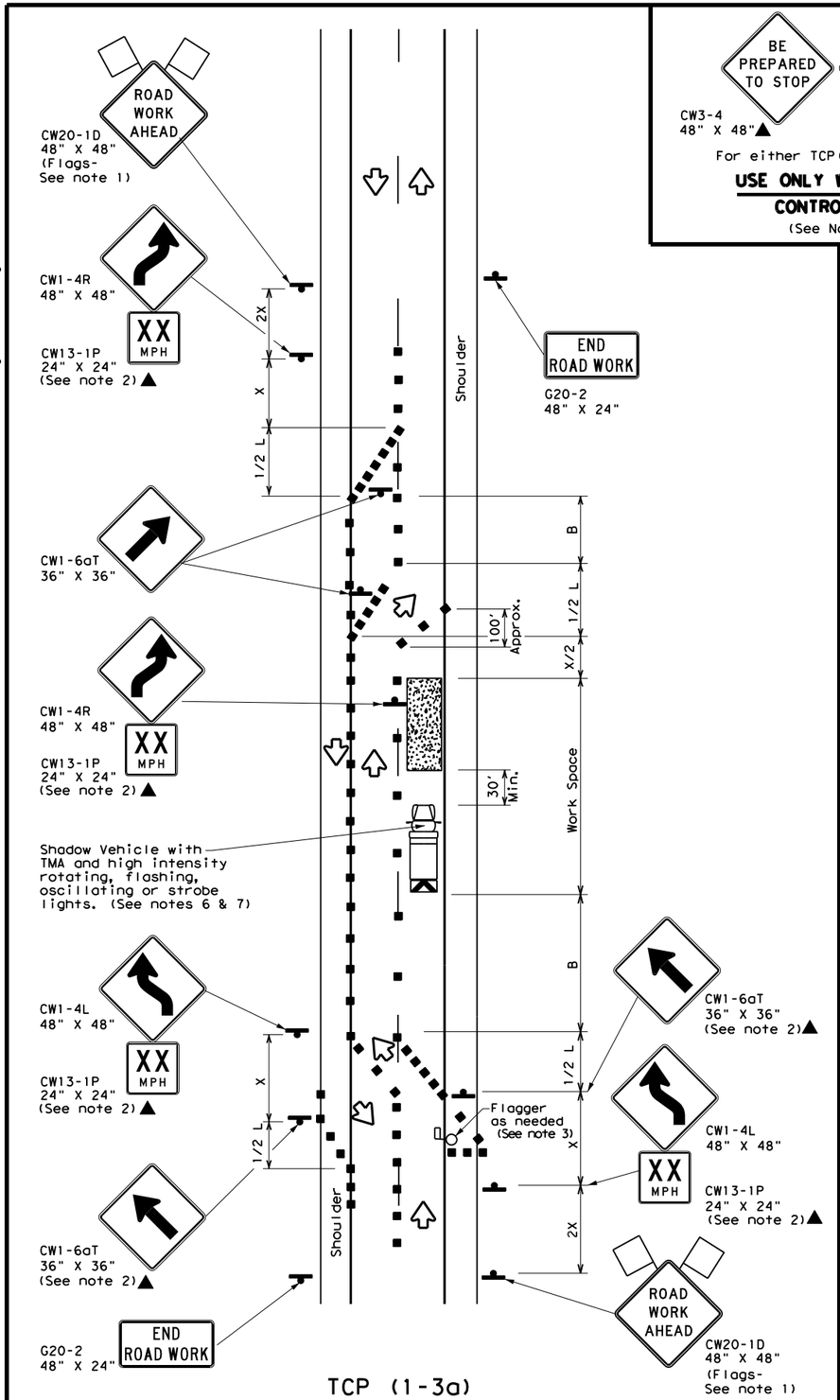
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

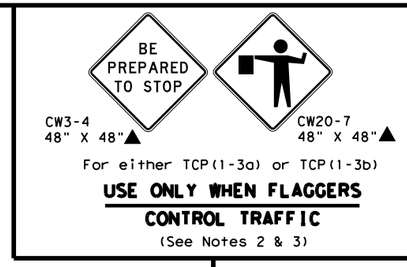
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0288	01	039,etc.	SH 16,etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE,ETC.		31

DATE:
FILE:



TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

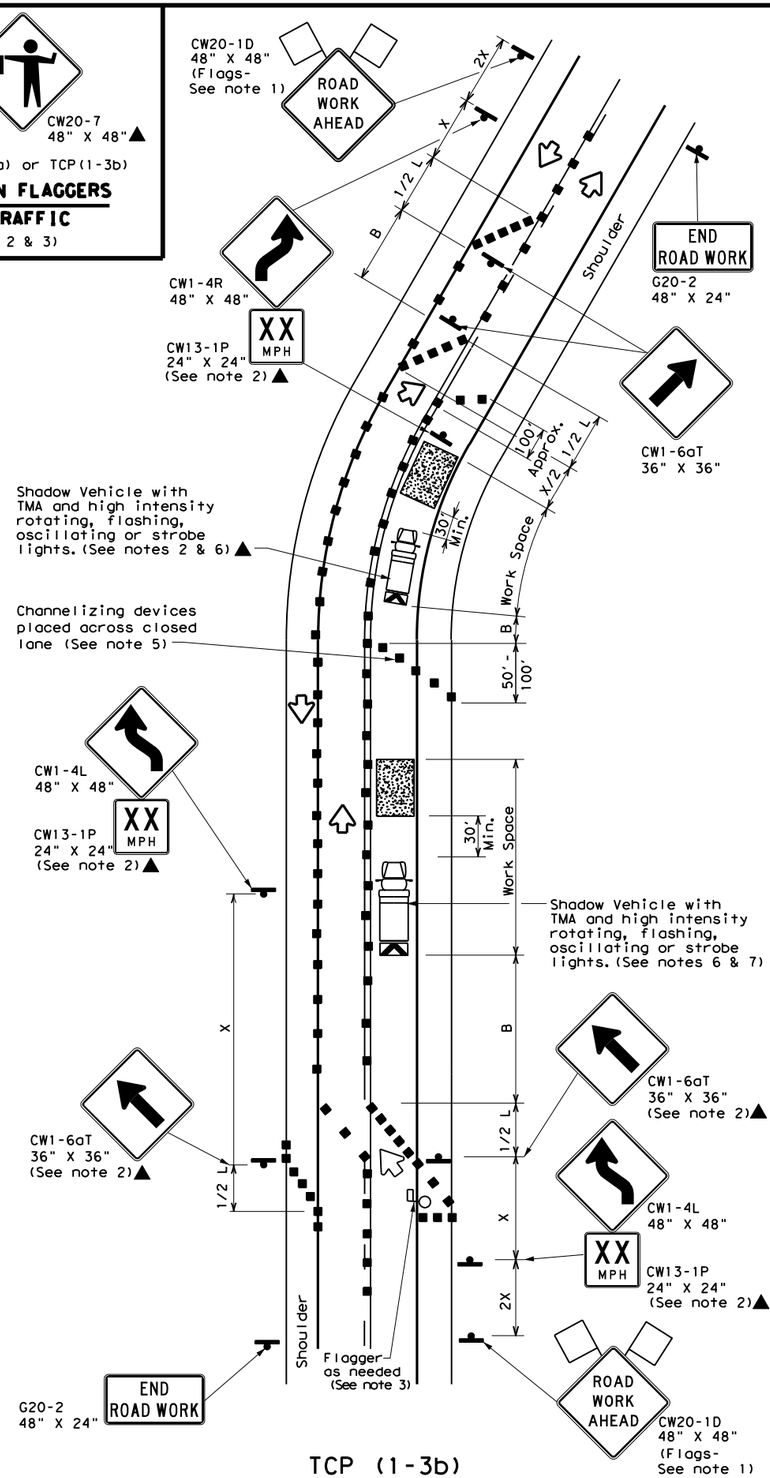
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	BWD	COMANCHE, ETC.		32
1-97 2-18				

DATE: 8/18/2021 4:31:58 PM
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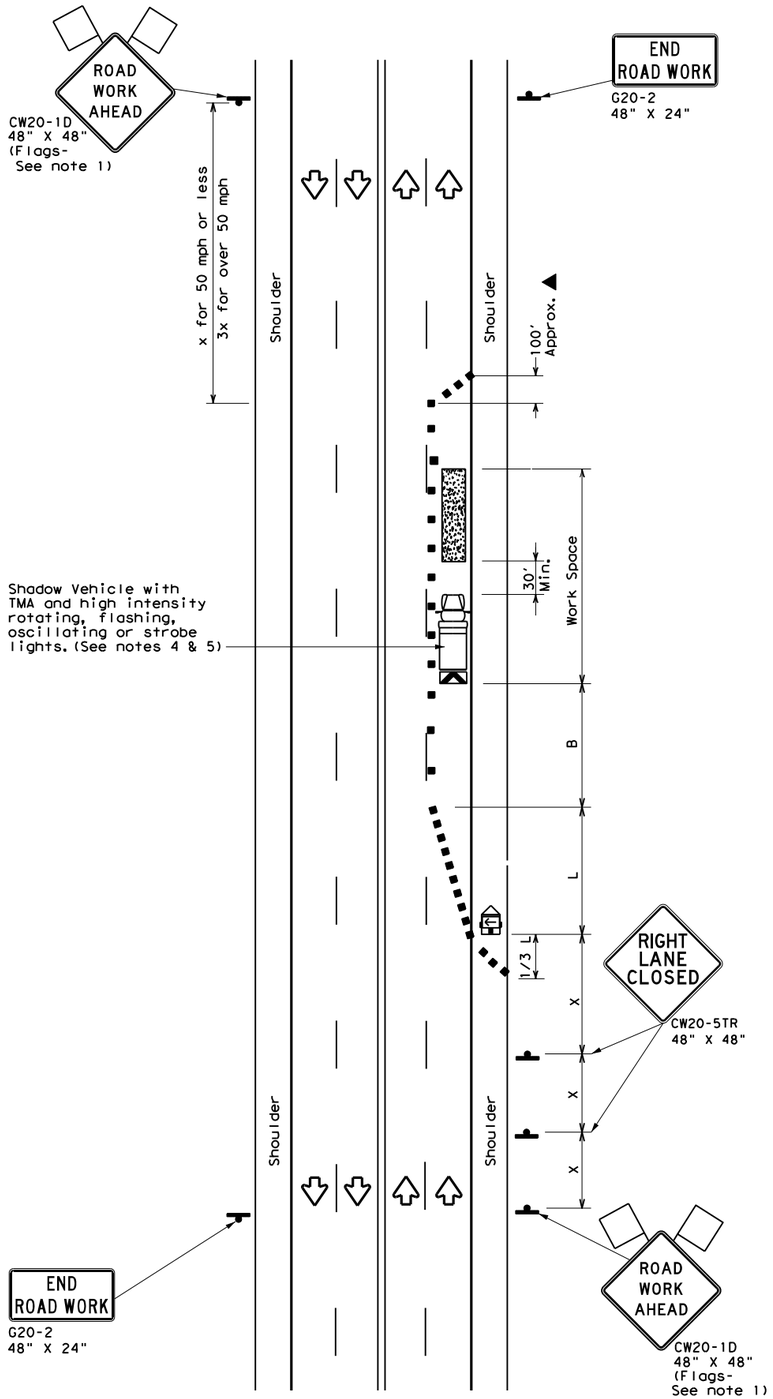
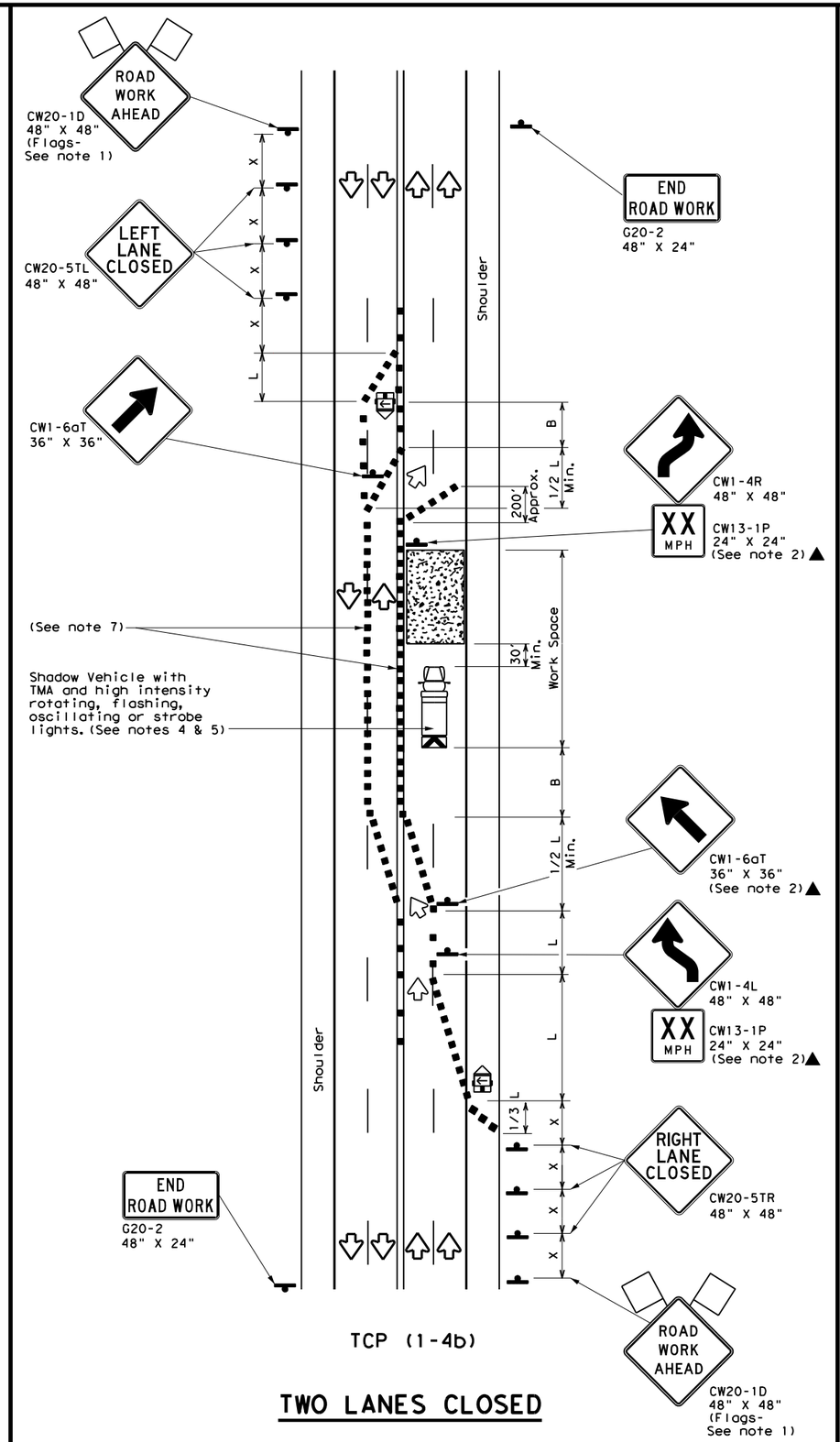


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	BWD	COMANCHE,ETC.		33
1-97 2-18				

DATE: 8/18/2021 4:31:59 PM
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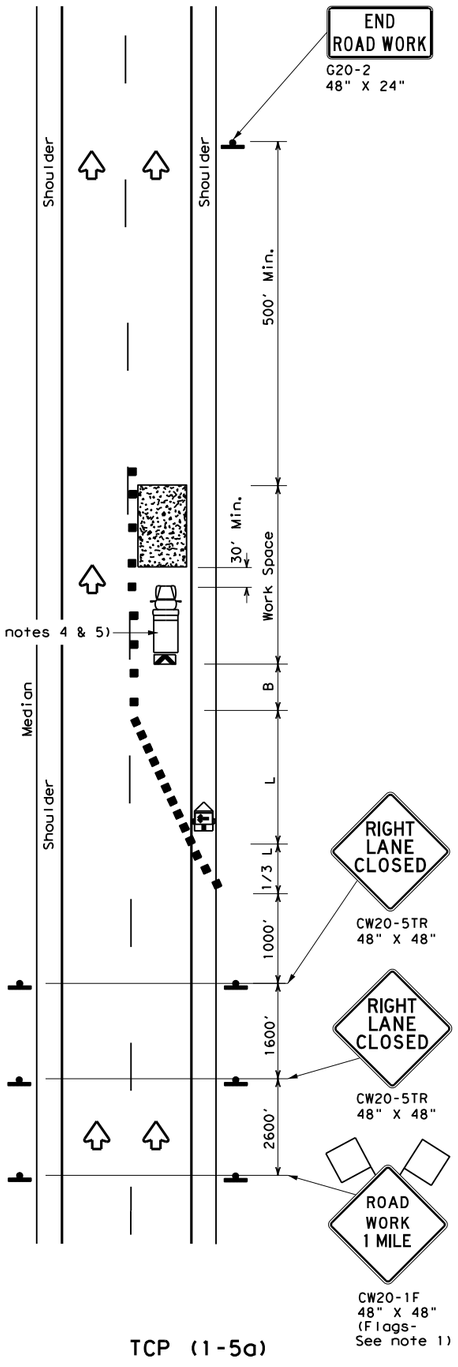
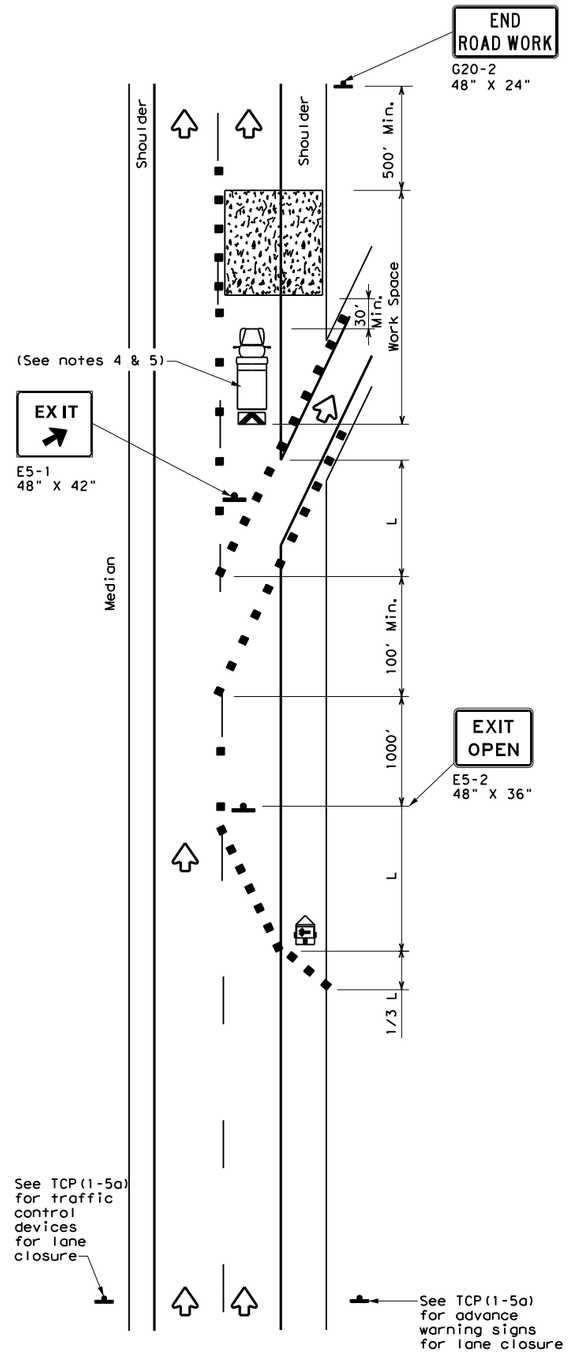


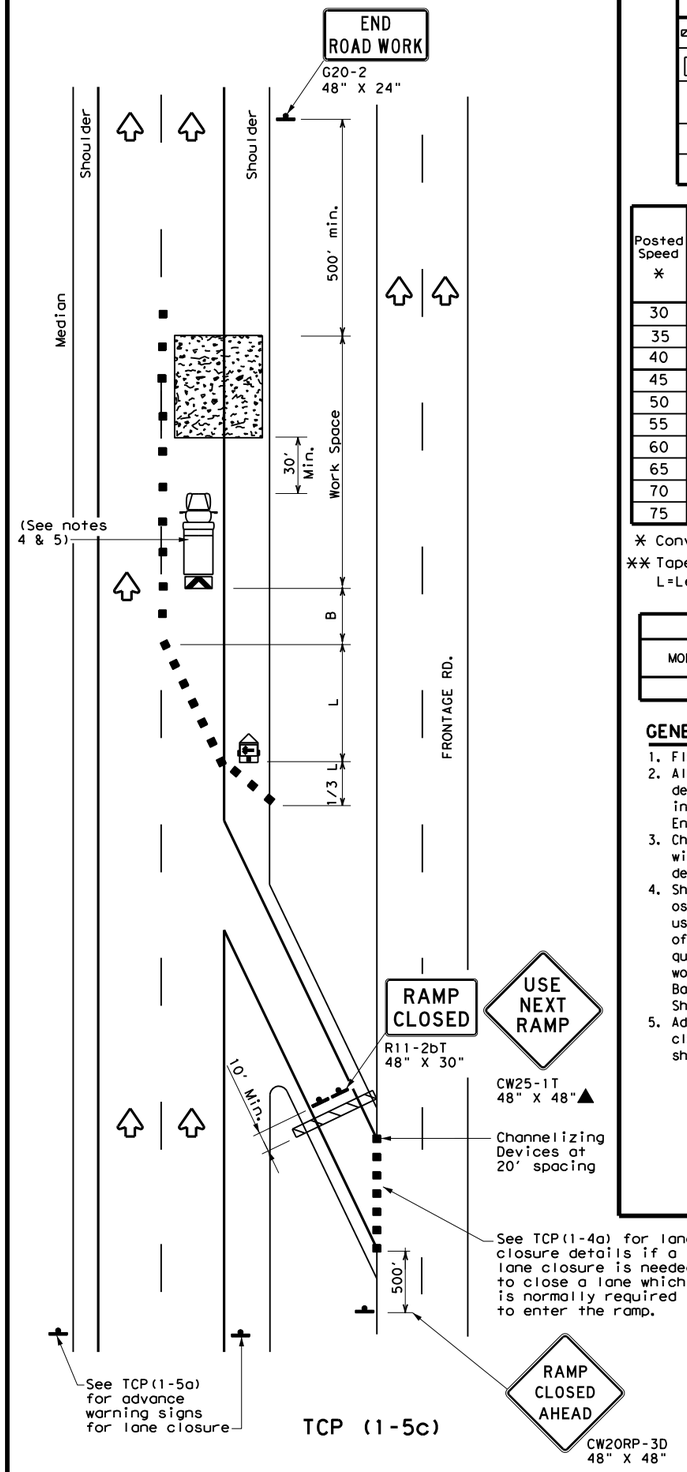
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓		

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0288	01	039,etc.	SH 16,etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE,ETC.		34

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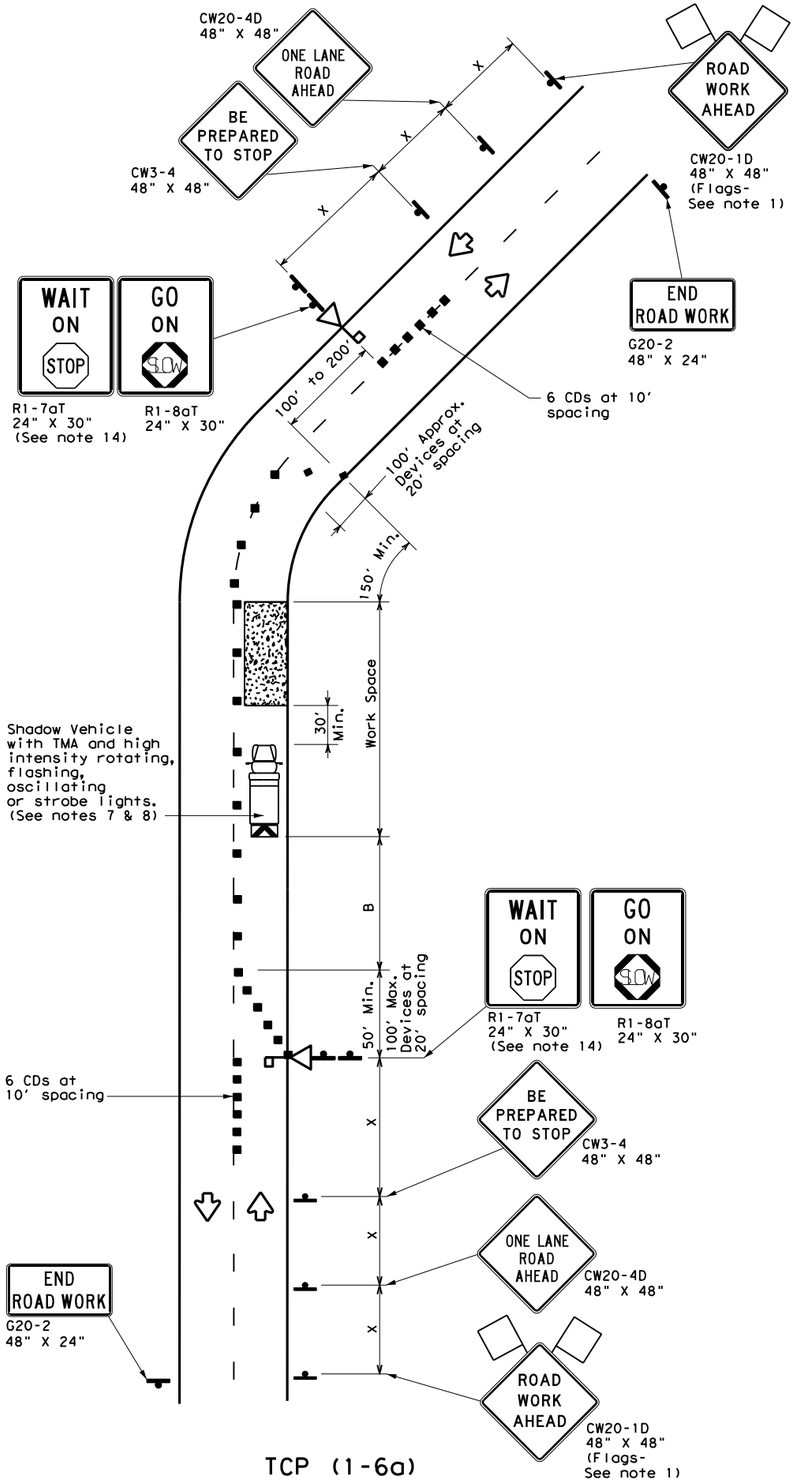
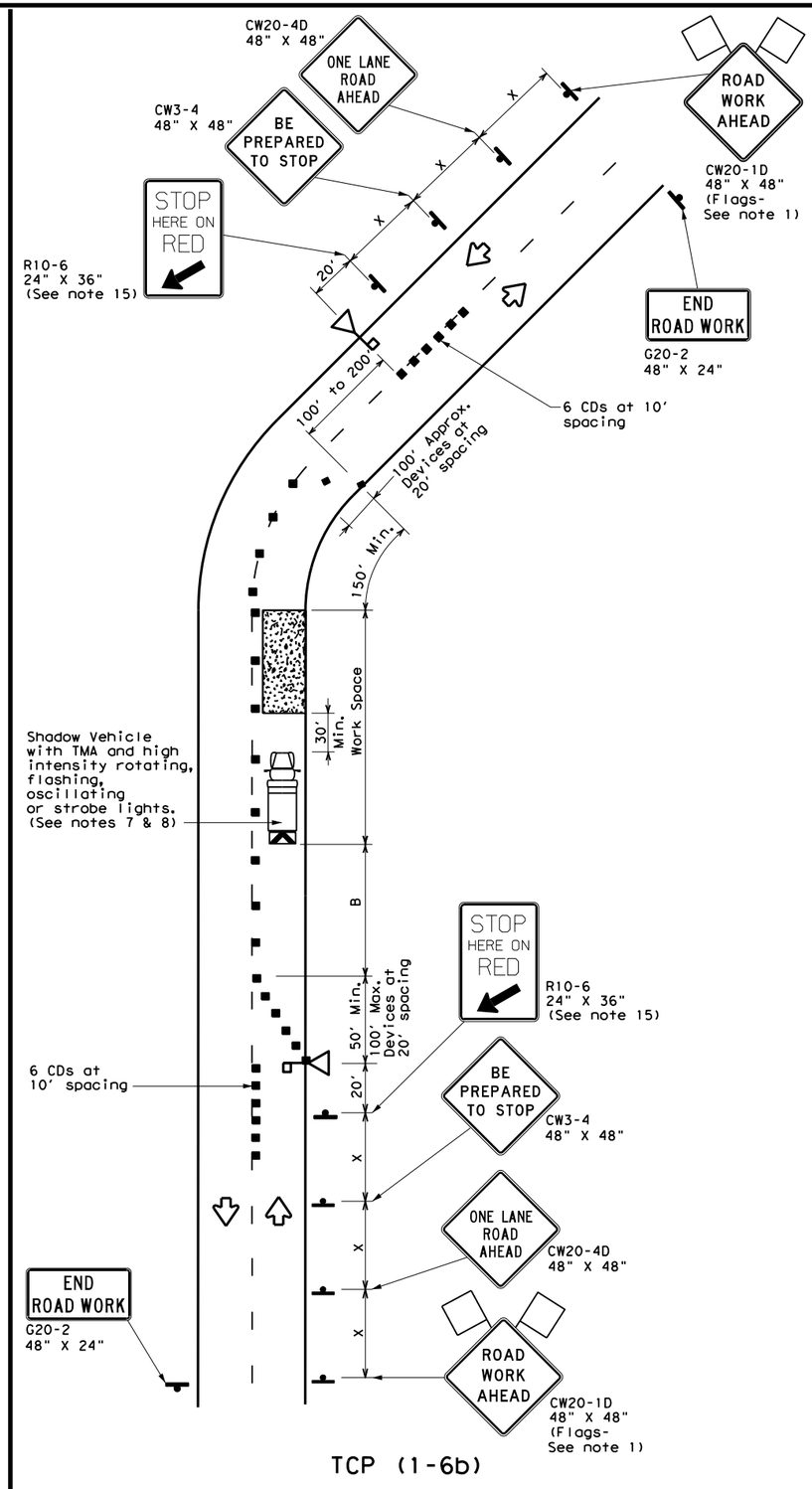


TCP (1-6a)

ONE LANE TWO-WAY CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)

ONE LANE TWO-WAY CONTROL WITH RED/YELLOW LENS AFADs

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
3. Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
4. Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
5. One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
6. When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
7. All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
8. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
9. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
13. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
15. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)

TCP(1-6)-18

FILE: tcp1-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	BWD	COMANCHE,ETC.		35

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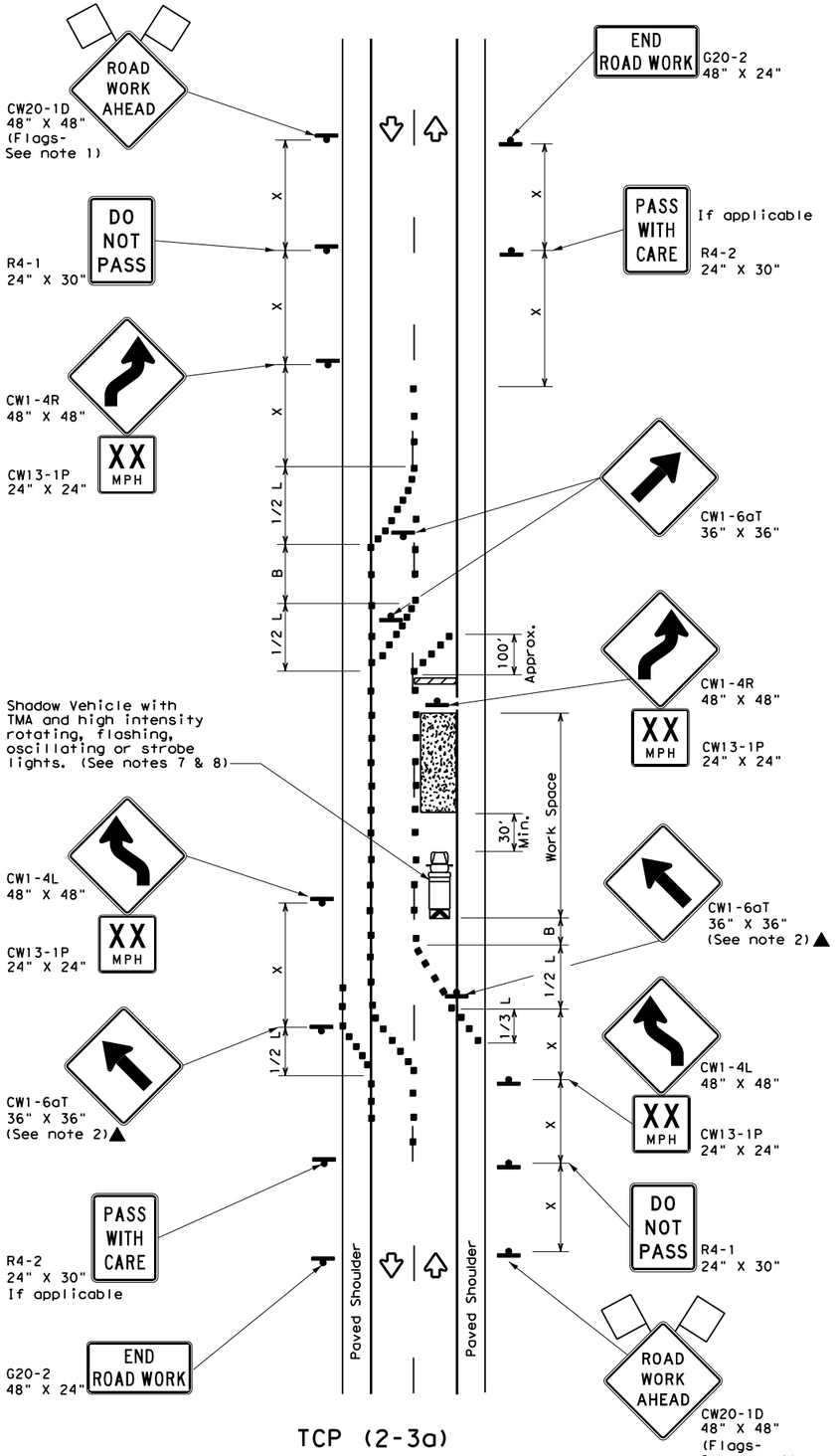
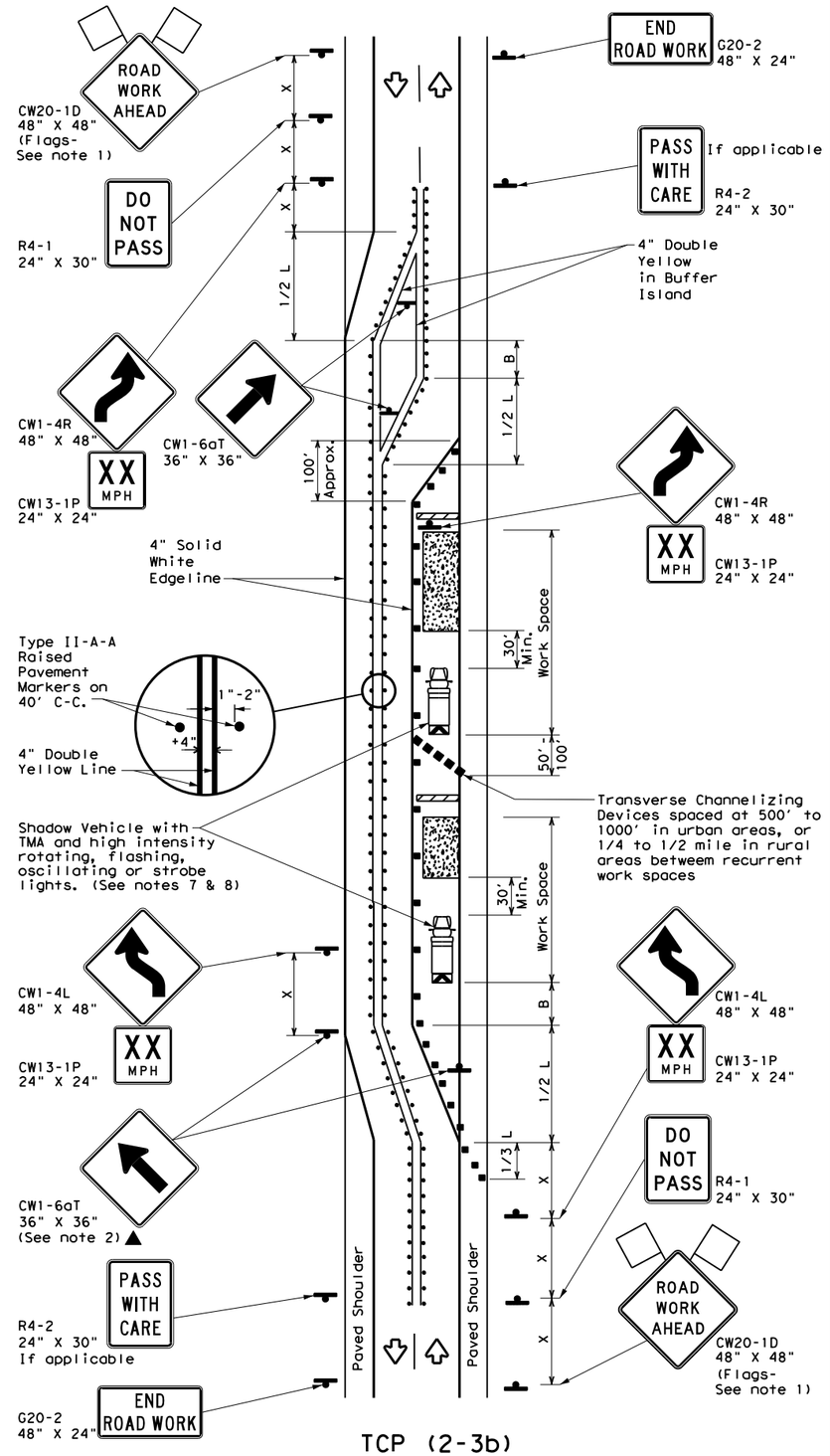


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	• • • •	Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	BWD	COMANCHE,ETC.		36
4-98 2-18				

DATE: 8/18/2021 4:32:02 PM
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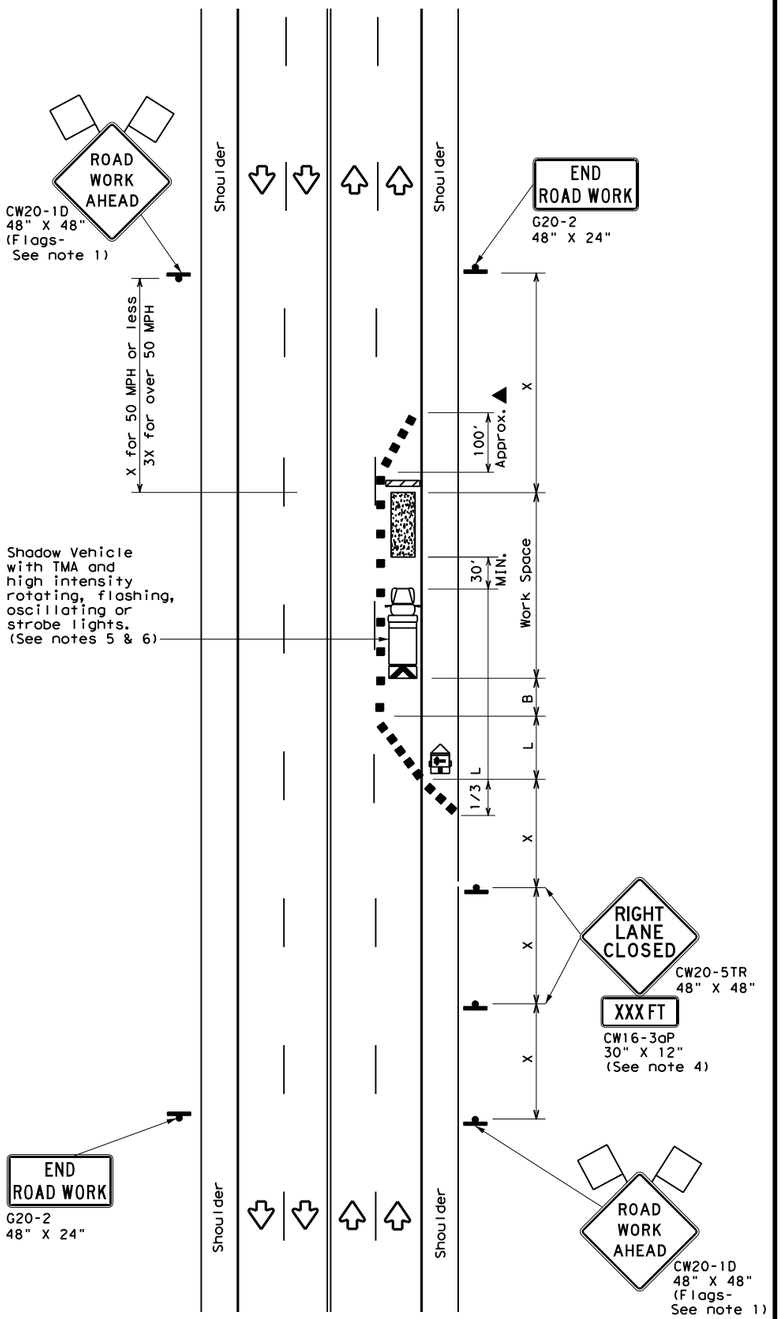
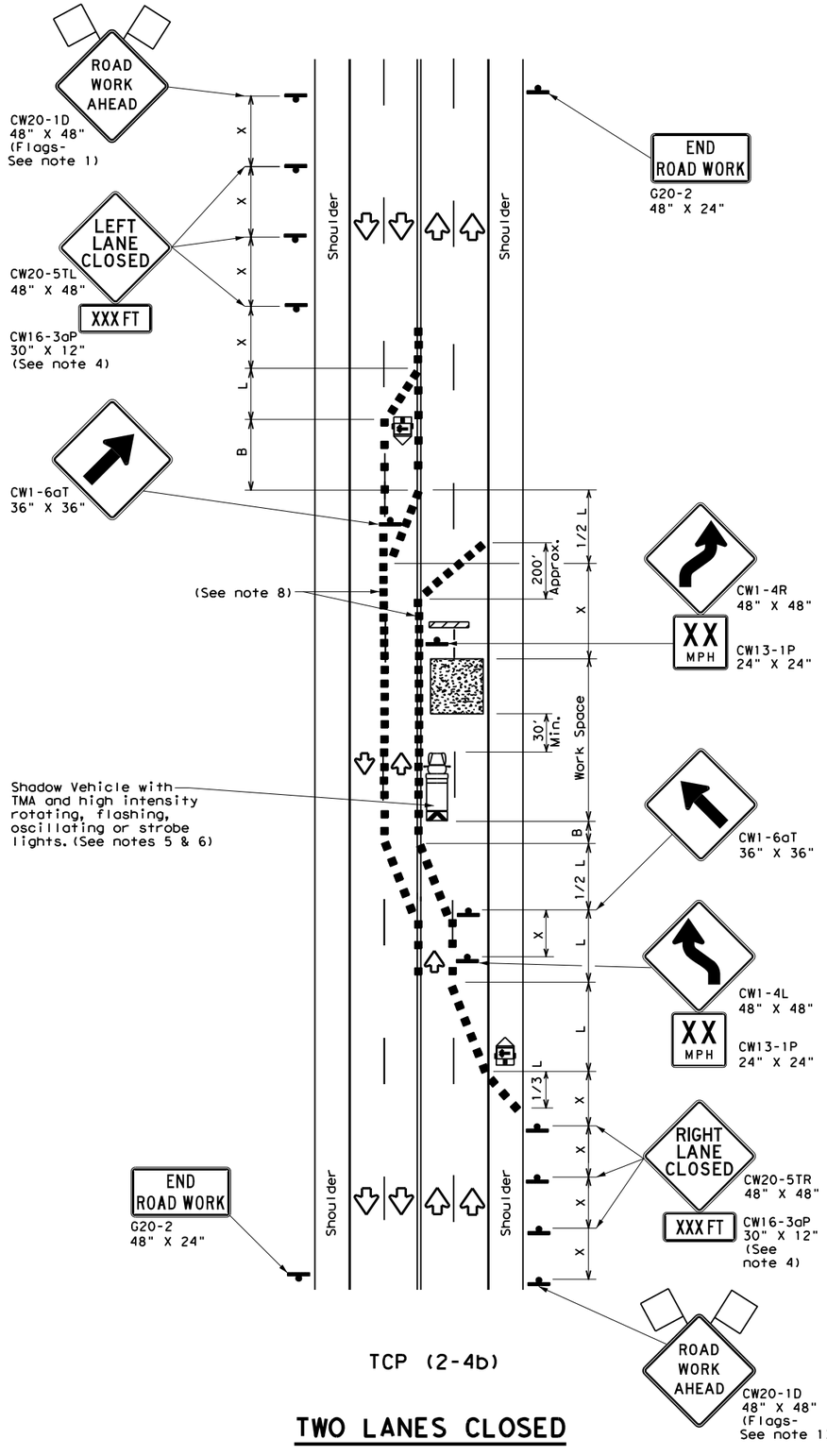


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0288	01	039,etc.	SH 16,etc.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	BWD	COMANCHE,ETC.		37

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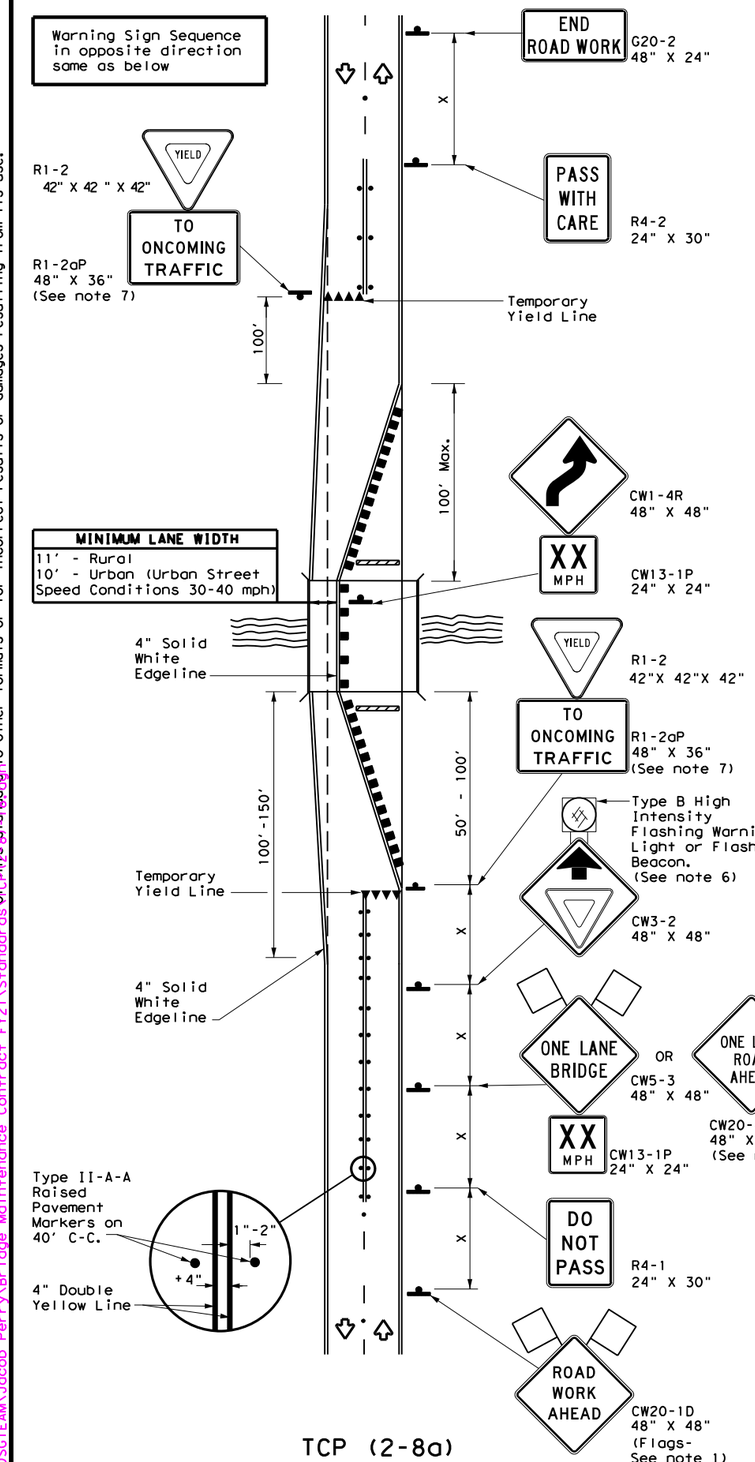
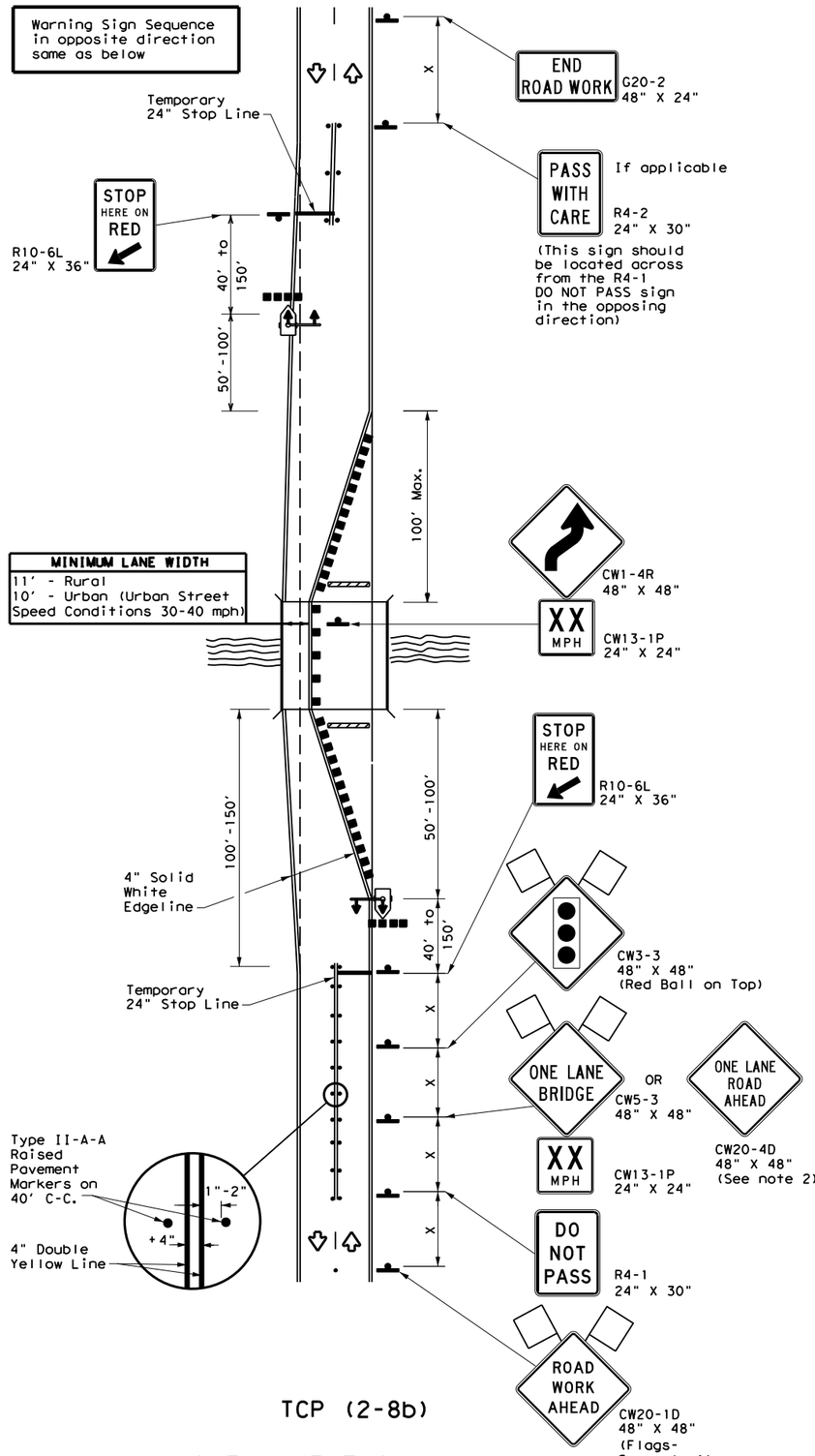


TCP (2-8a)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM ONE-LANE TWO-WAY CONTROL

TCP(2-8)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	BWD	COMANCHE,ETC.		38
4-98 2-18				

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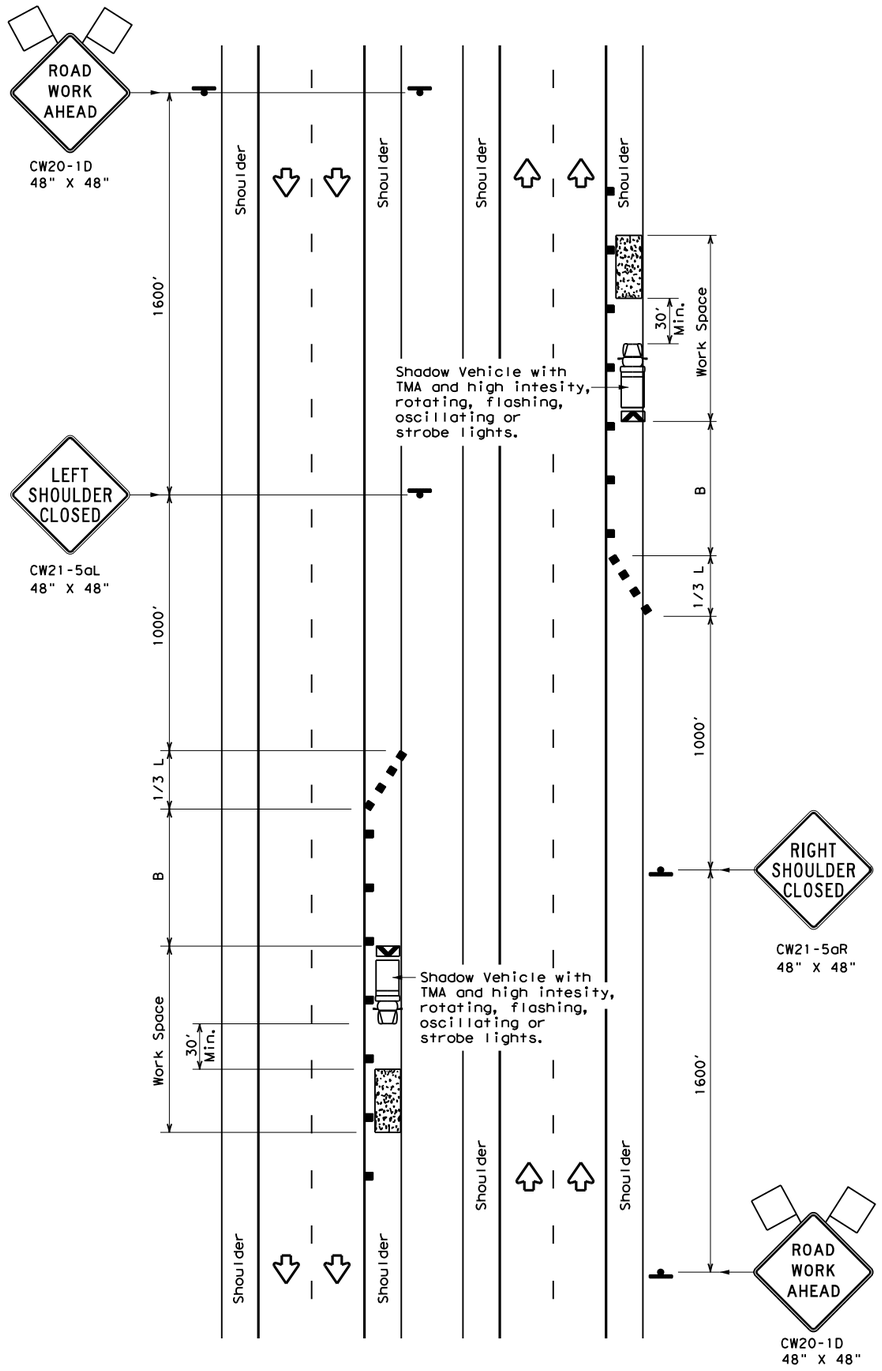
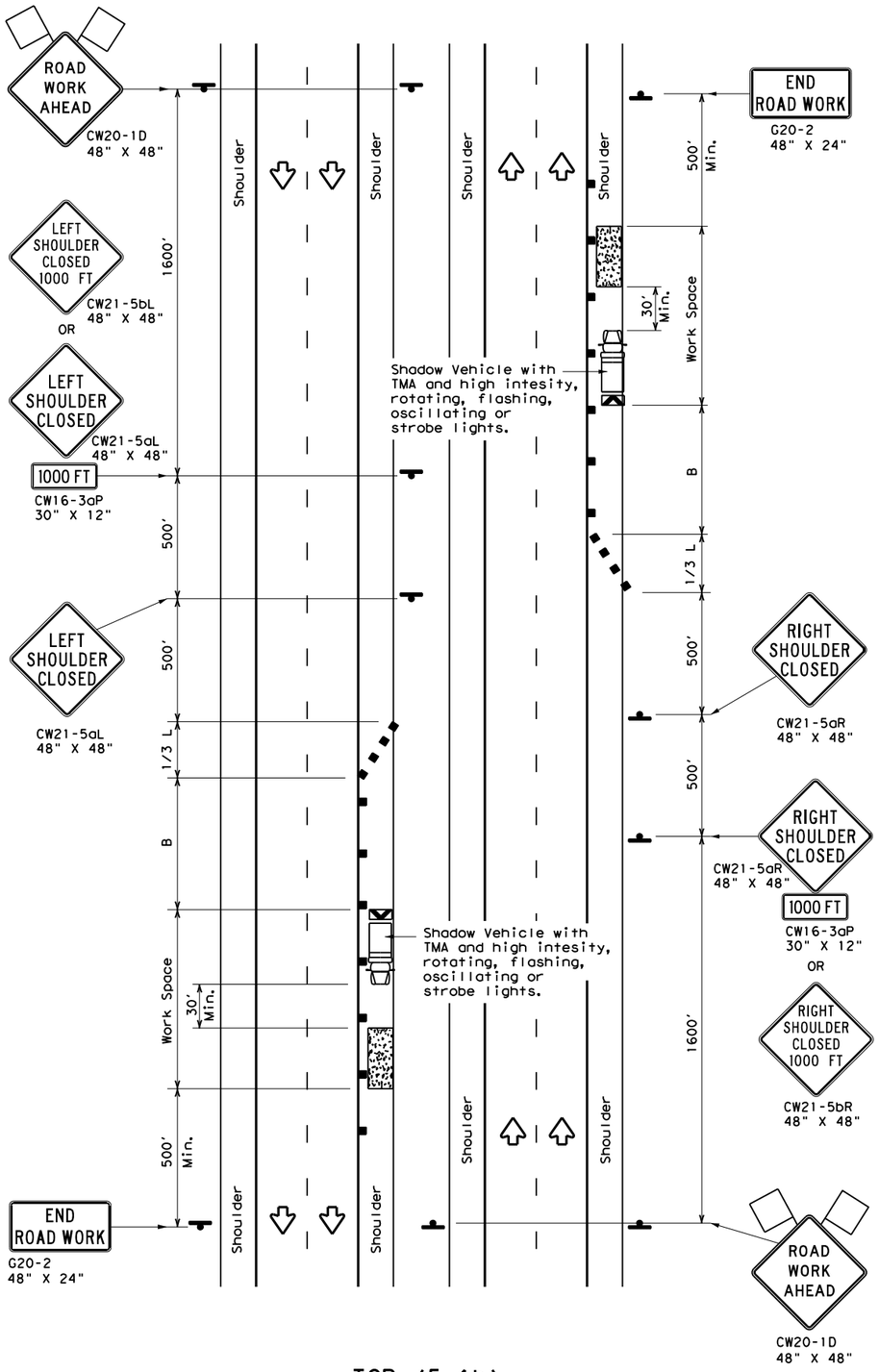


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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2-18	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		39

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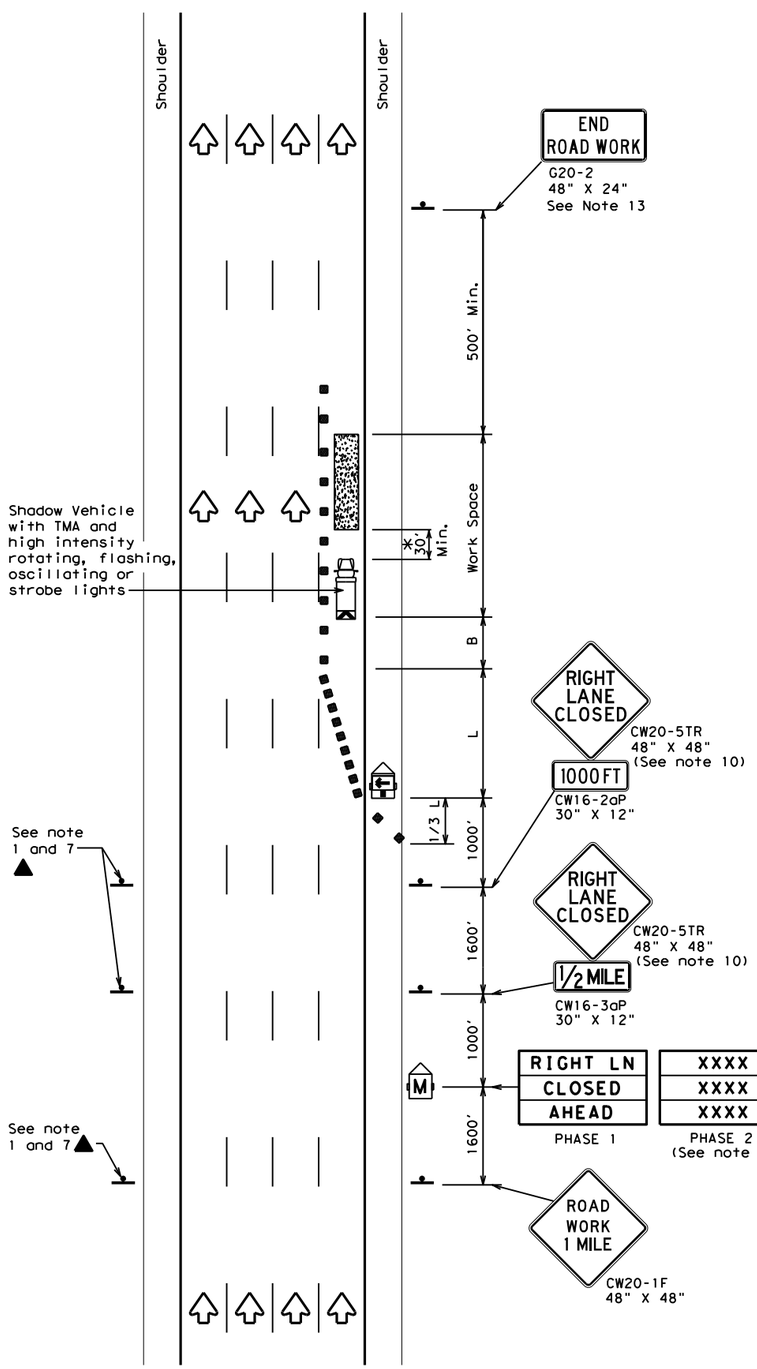
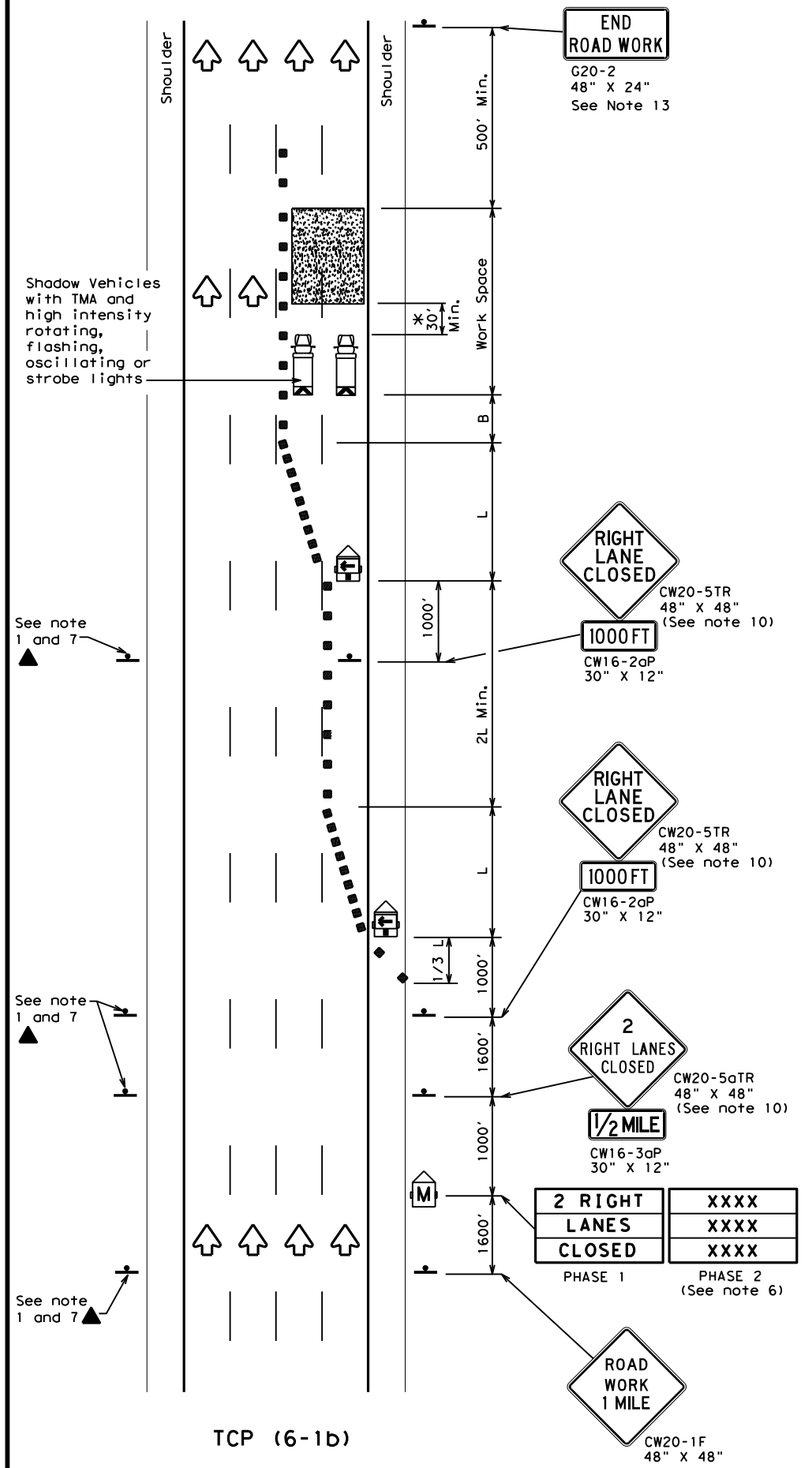


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE,ETC.		40

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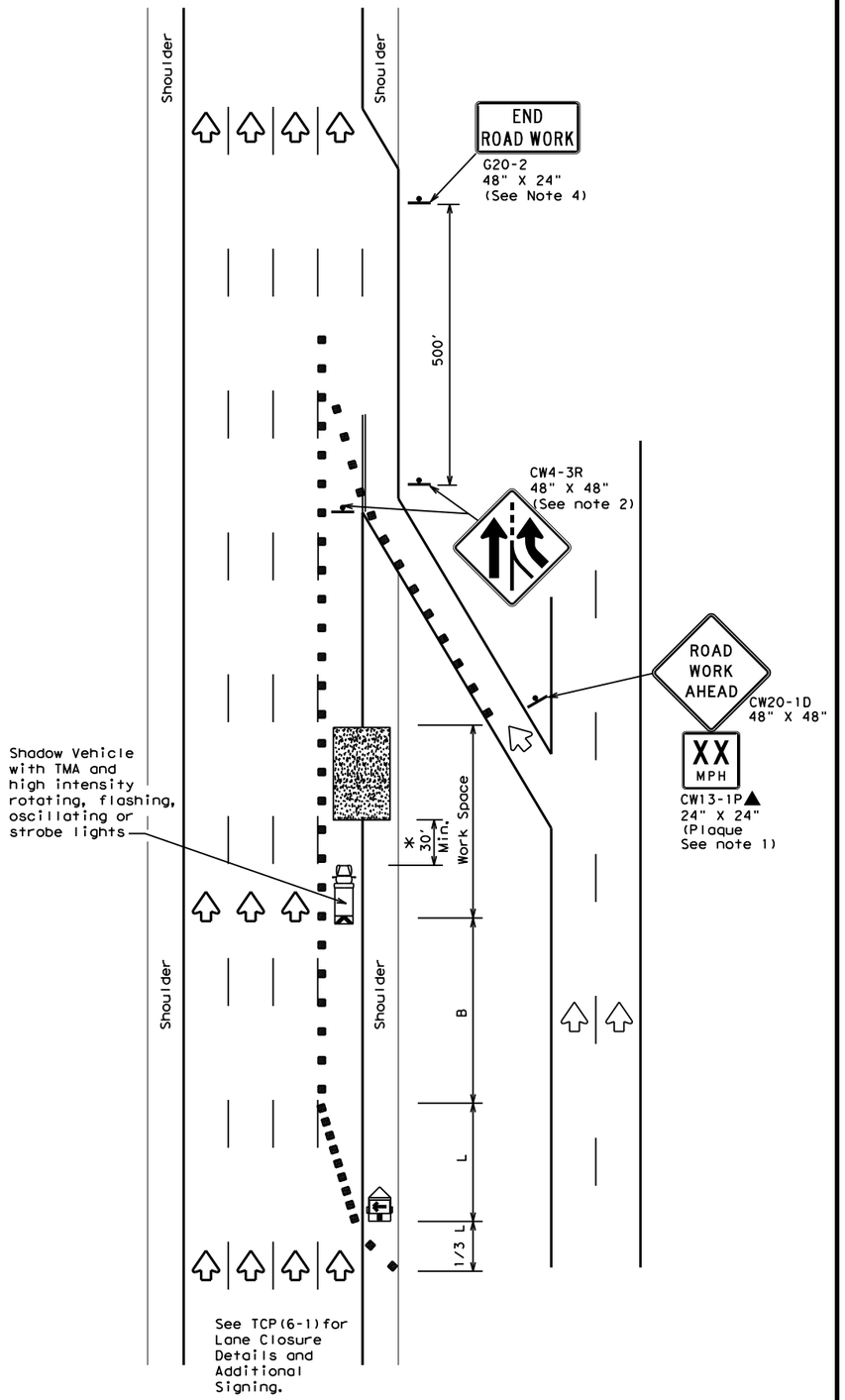
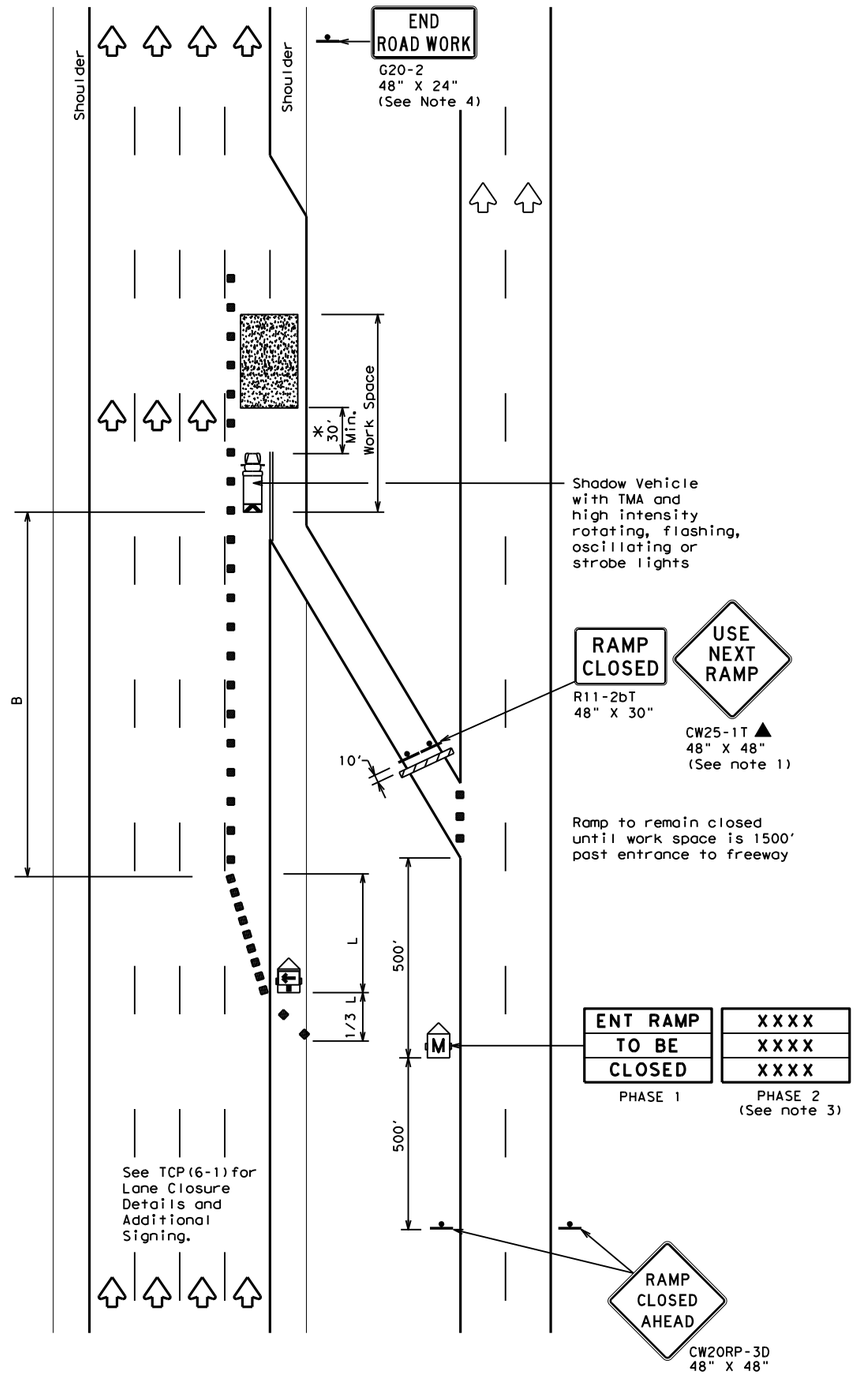


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

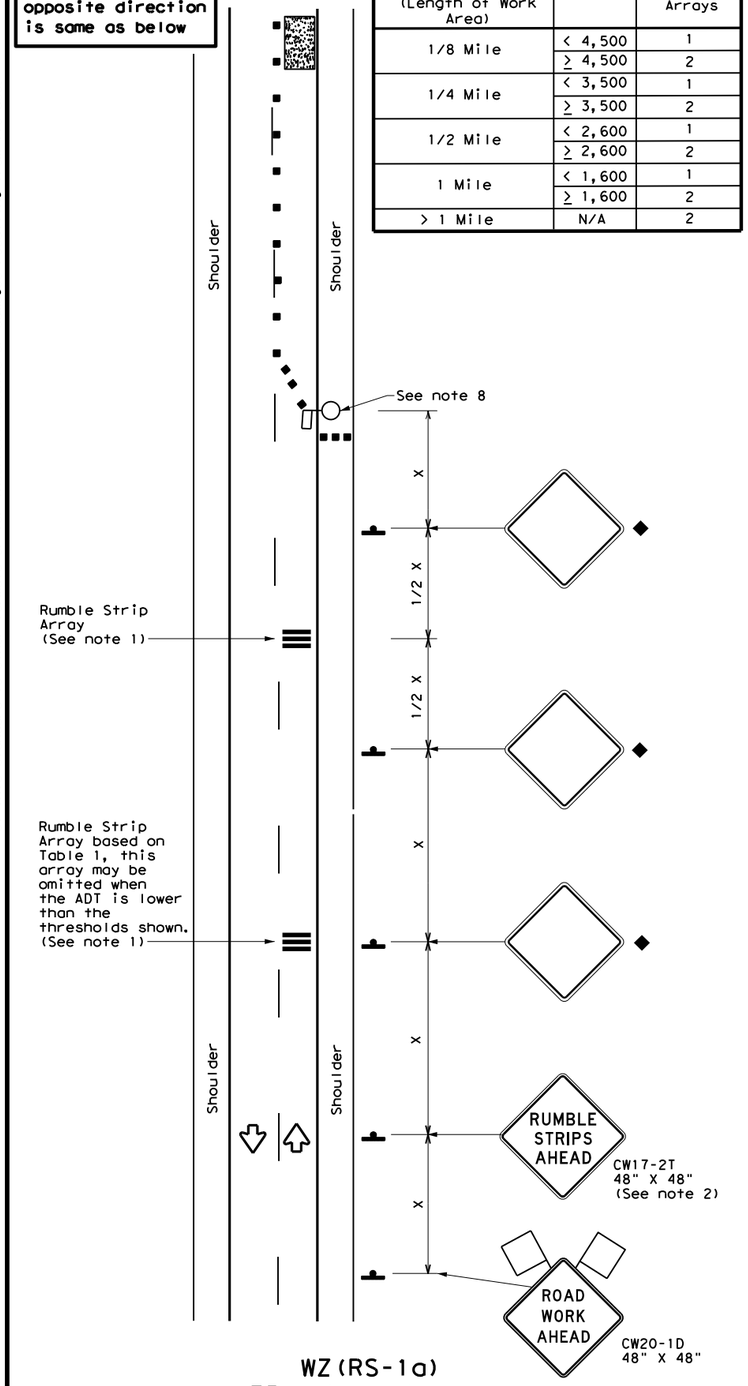
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	BWD	COMANCHE,ETC.		41

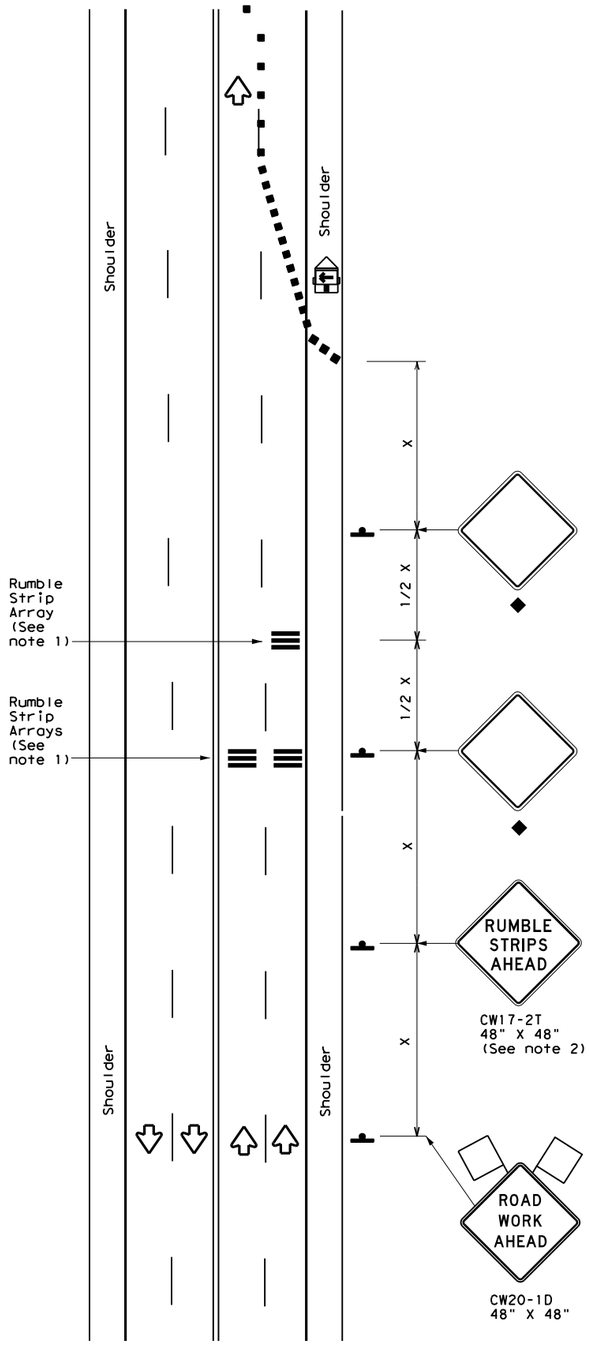
Warning sign and rumble strip sequence in opposite direction is same as below



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT)
S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

◆ **Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.**

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039,etc.	SH 16,etc.
2-14	DIST	COUNTY		SHEET NO.
4-16	BWD	COMANCHE,ETC.		42

DATE:
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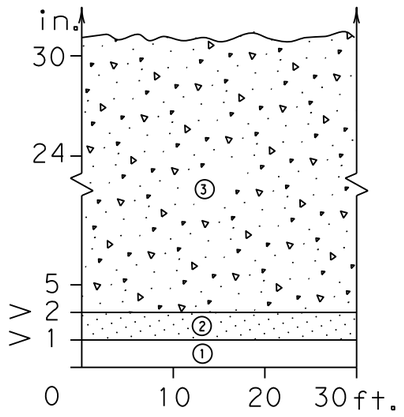
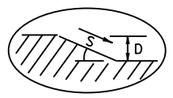
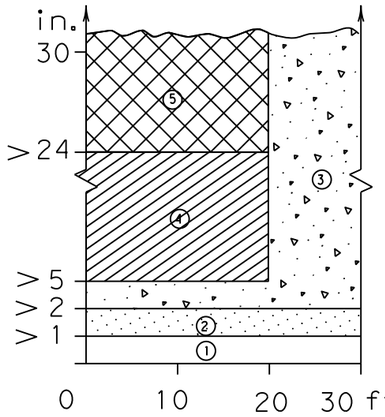
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

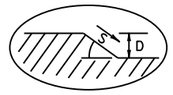


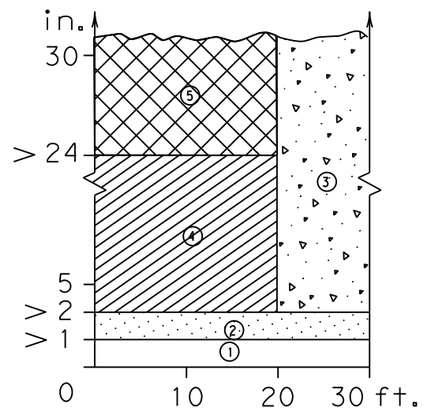
Edge Condition I
S = (3:1) (or flatter)



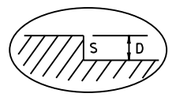


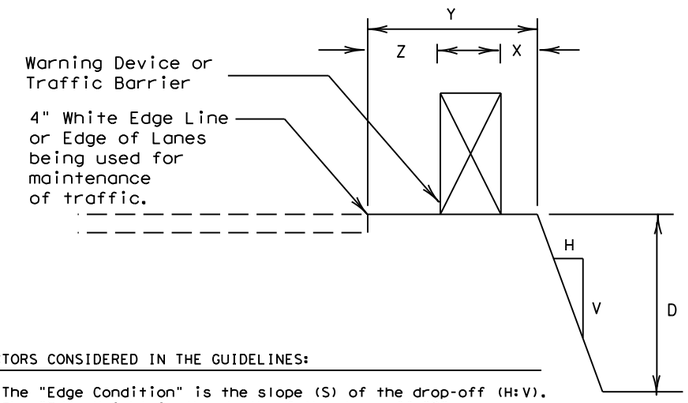
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

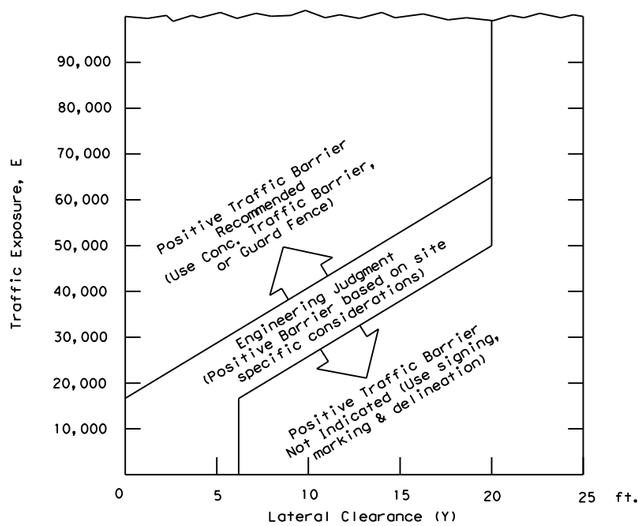
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

Date 08/19/2021

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
03-01	0288	01	039,ETC.	SH 16, ETC
08-01 correct typos	DIST	COUNTY		SHEET NO.
	23	COMANCHE, ETC.		43

DATE: 8/18/2021
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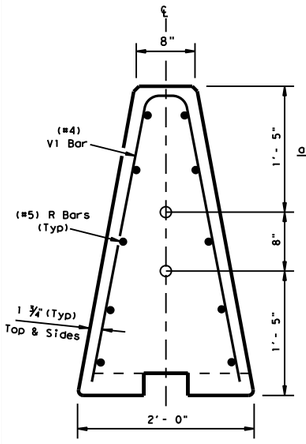
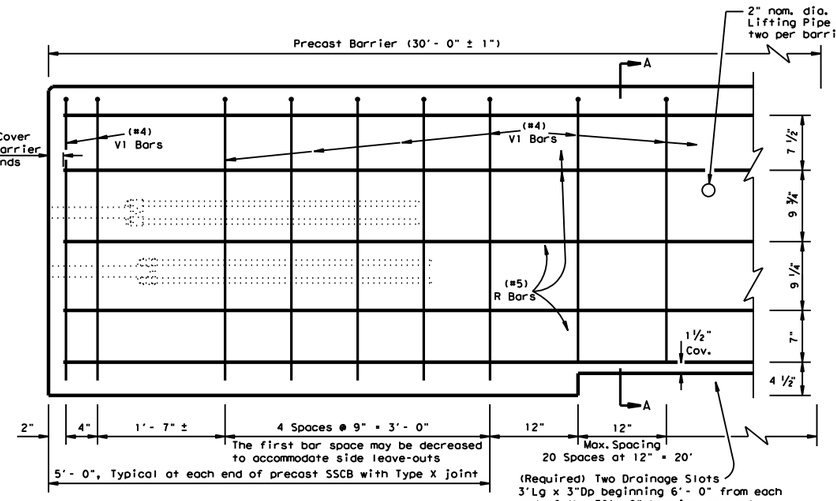


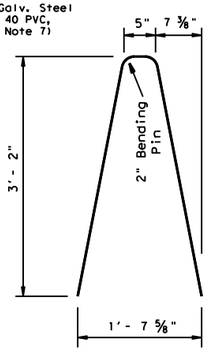
End View
Precast Barrier

Pipe locations for Joint Type X connection



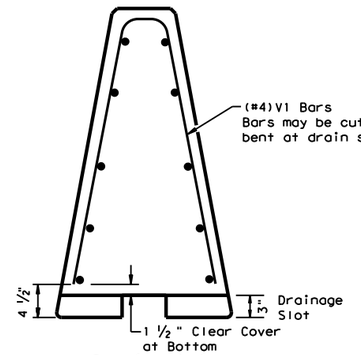
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



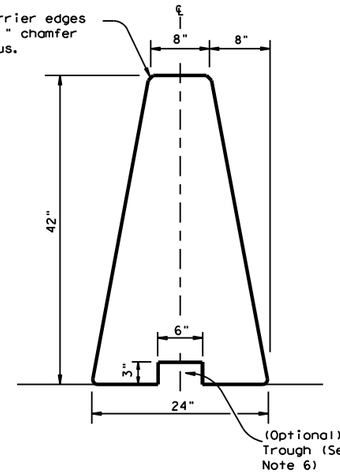
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



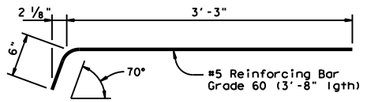
Section A-A
Steel Placement at (Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



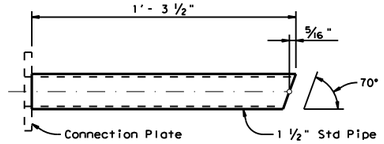
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



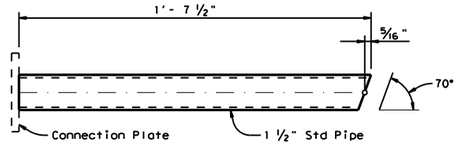
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



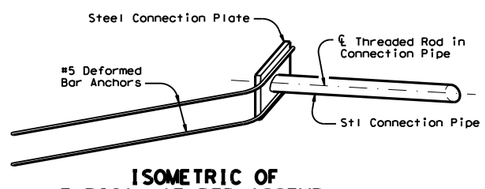
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.

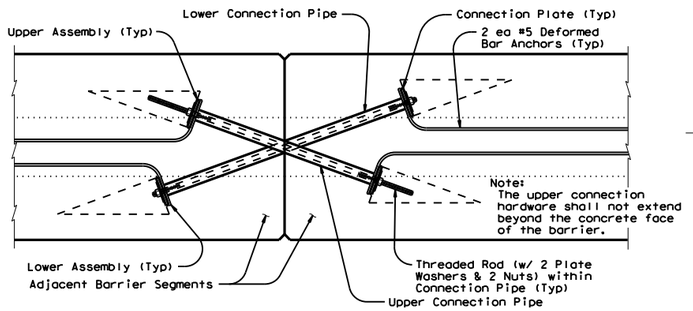


ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

General Notes

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

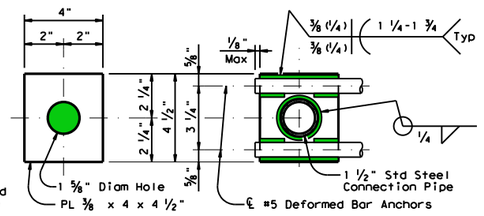
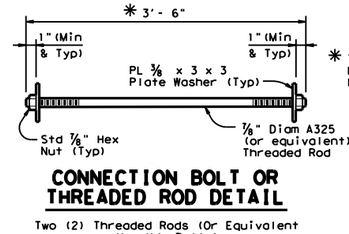


PLATE DIMENSIONS **WELDING DETAILS**

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

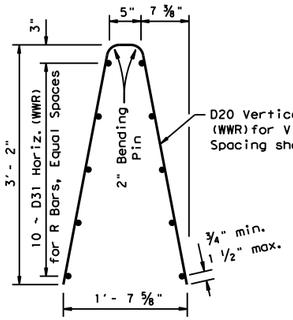


* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

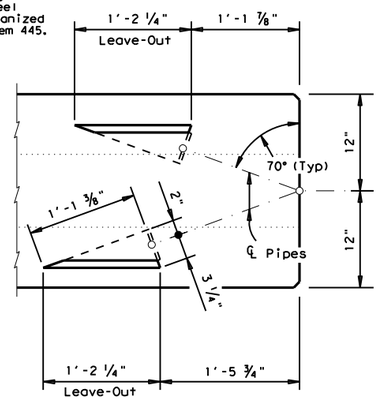
Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



Welded Wire Reinforcement (WWR) Option for Bars R and V1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
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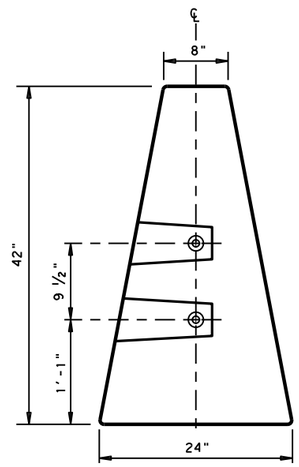
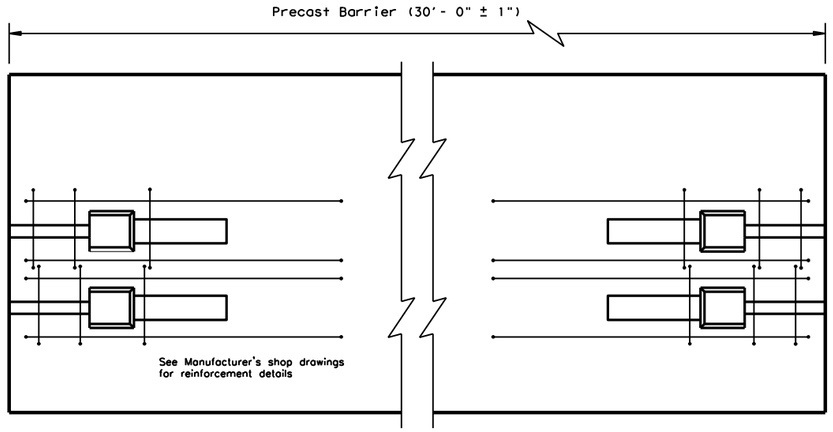
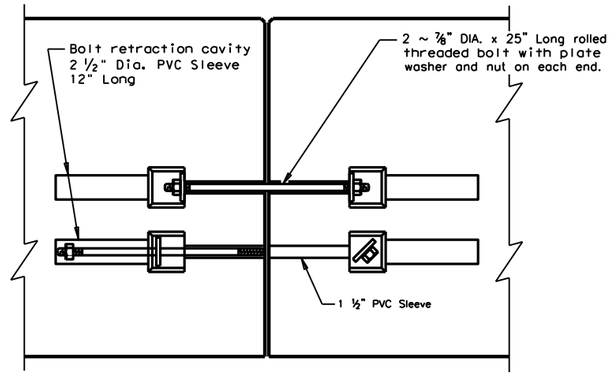


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

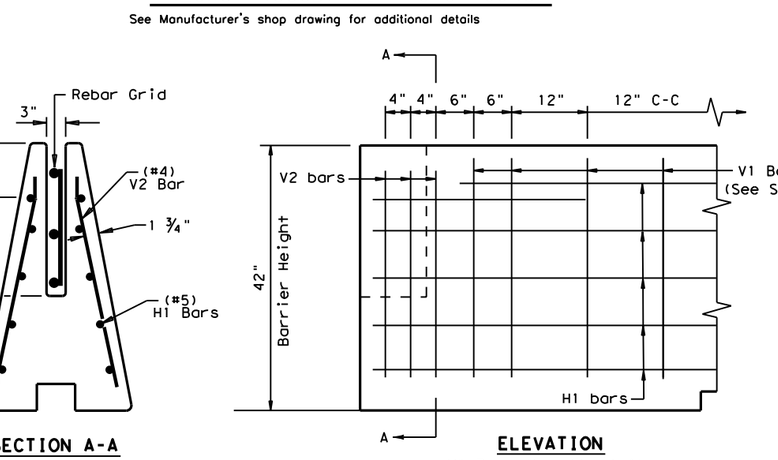


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

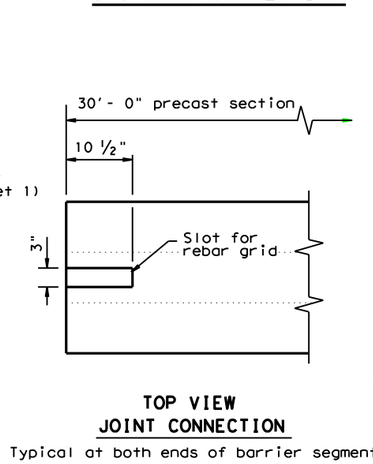


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION

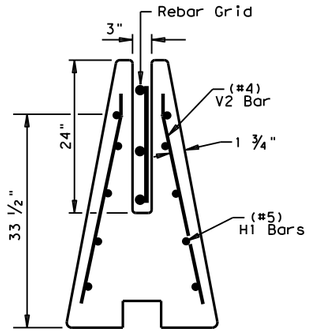
END VIEW

Proprietary Joint Connections (SSCB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

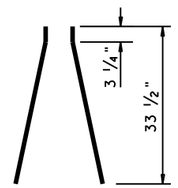
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



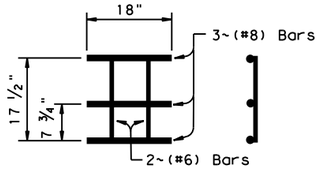
SECTION A-A
Showing (Type R) Rebar Grid

ELEVATION
V1 Bars (See Sheet 1)

TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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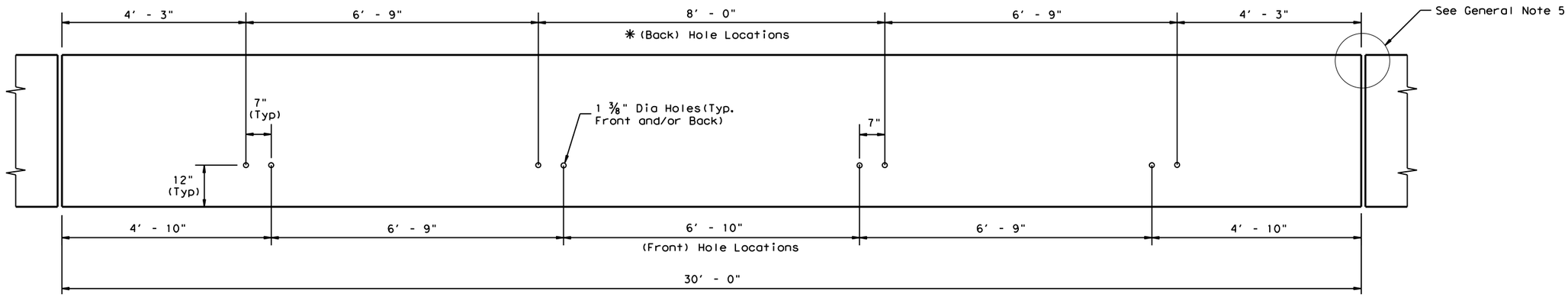
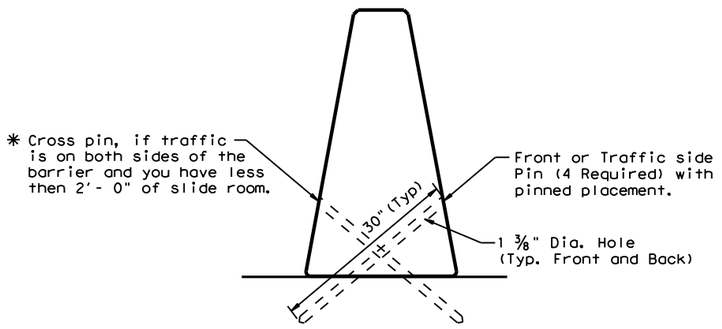


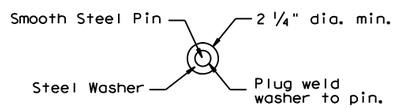
DETAIL 1

Precast SSCB(42")
Showing hole locations

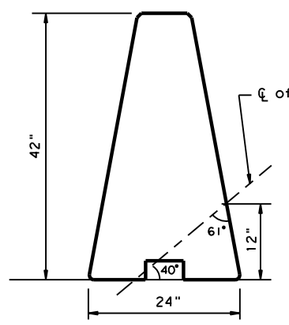


DETAIL 2

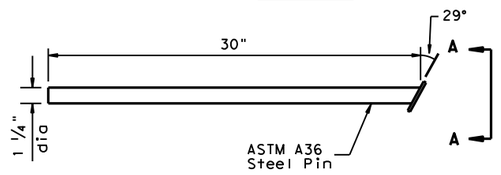
Placement on (ACP)
Asphalt Conc. Pavement
or Treated Base Material
(30" Pin required)



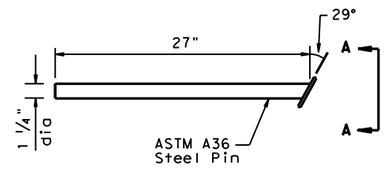
VIEW A-A



HOLE LOCATION DETAIL



(30") PIN DETAIL
See Detail 2

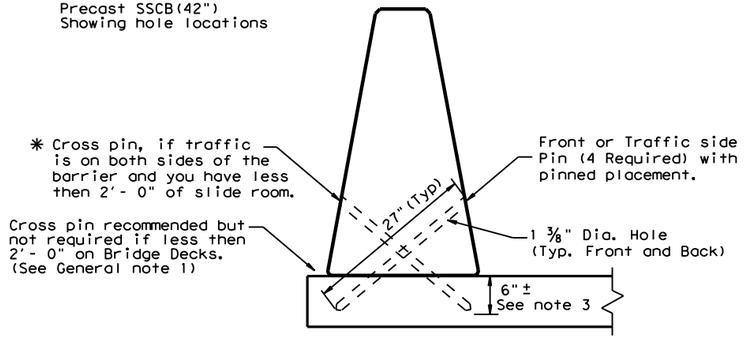


(27") PIN DETAIL
See Detail 3

Note:
Steel washer welded to pin at 29° angle so that the washer is flush with barrier surface. (See View A-A)

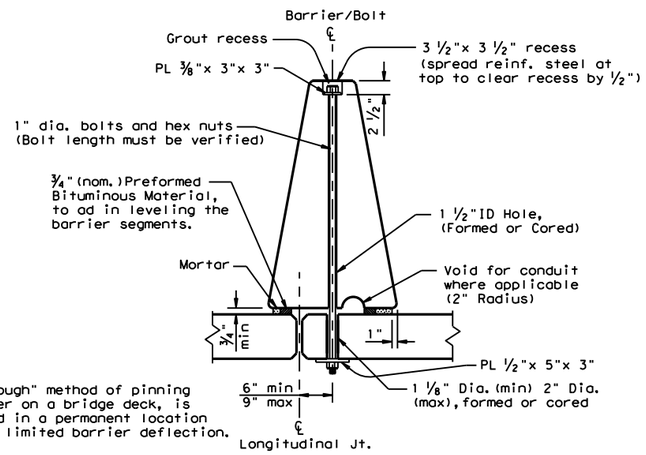
DETAIL 3

Bridge Deck or CRCP
(27" Pin required).



CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less then 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
2. Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8 in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
3. The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing though the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
4. Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
5. See SSCB(2) standard sheet for reinforcement requirements and joint connection types.
6. The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 1/4 in. pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
7. The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
8. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 700 lbs per foot.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)
PINNED PLACEMENT

SSCB(5)-10

FILE: sscb510.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
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REVISIONS	0288	01	039,etc.	SH 16,etc.
	DIST	COUNTY		SHEET NO.
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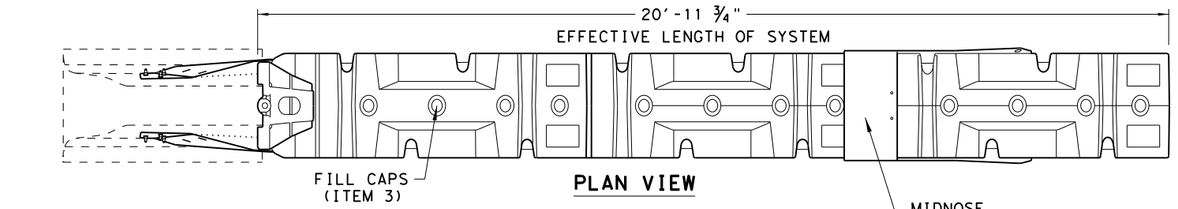
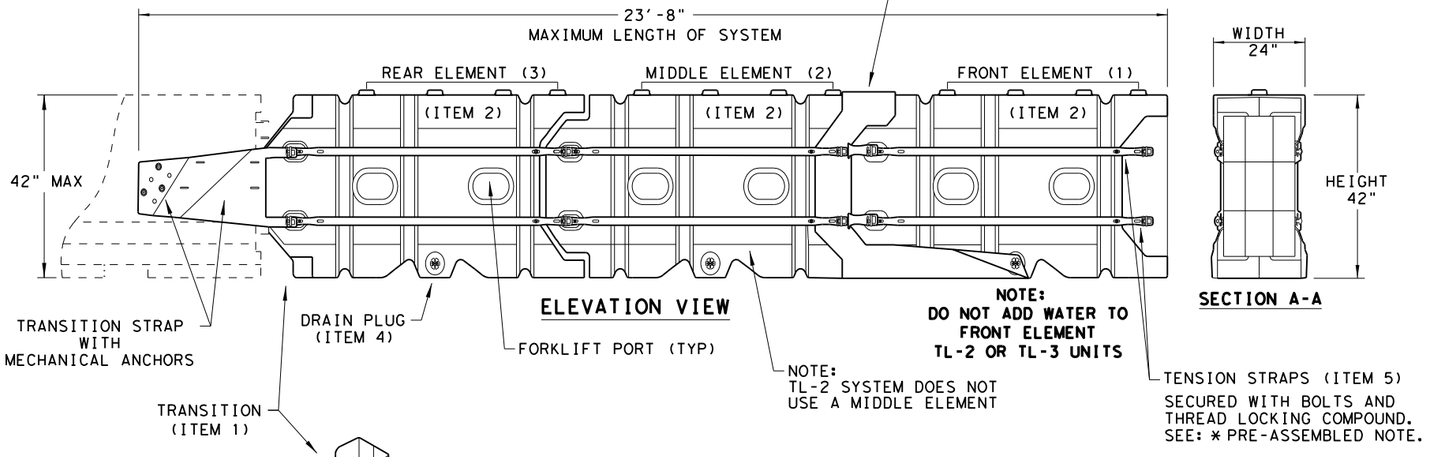
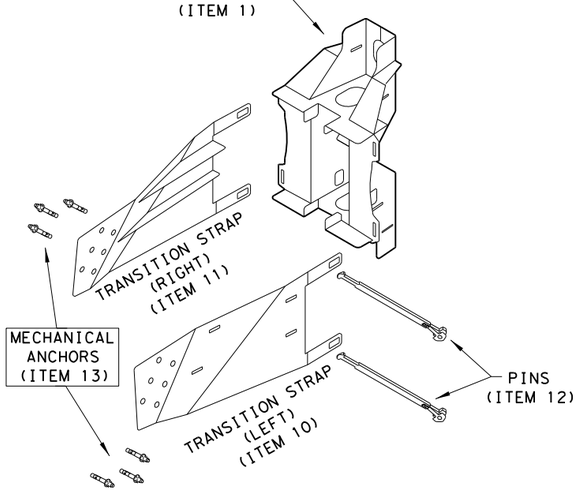
SYSTEM SHOWN - ABSORB-M TL-3







THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

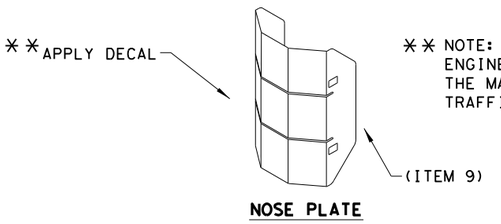
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

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	DIST	COUNTY		SHEET NO.
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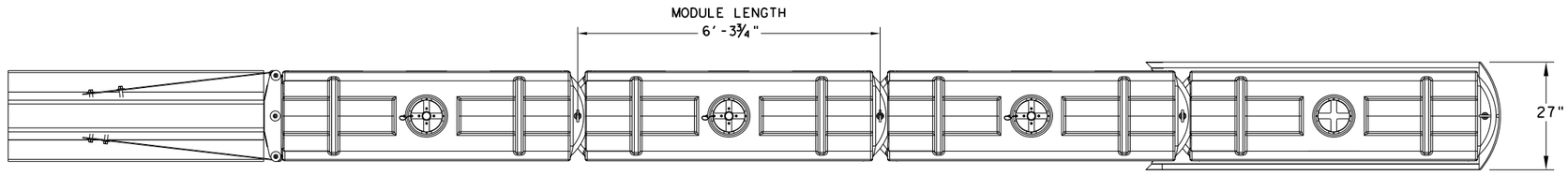
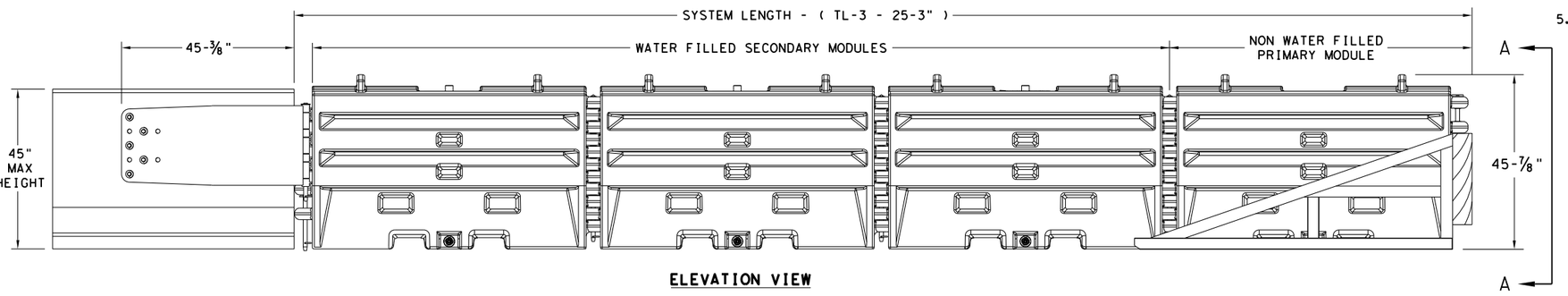


PLAN VIEW



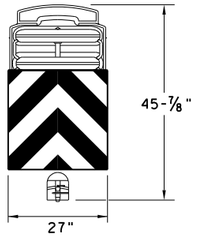
ELEVATION VIEW

GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

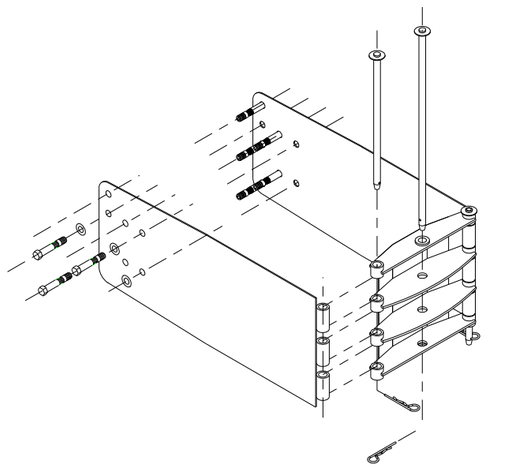
TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25' 3"



SECTION A-A

NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

BILL OF MATERIAL

PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1

Texas Department of Transportation — Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

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	BWD	COMANCHE, ETC.		48

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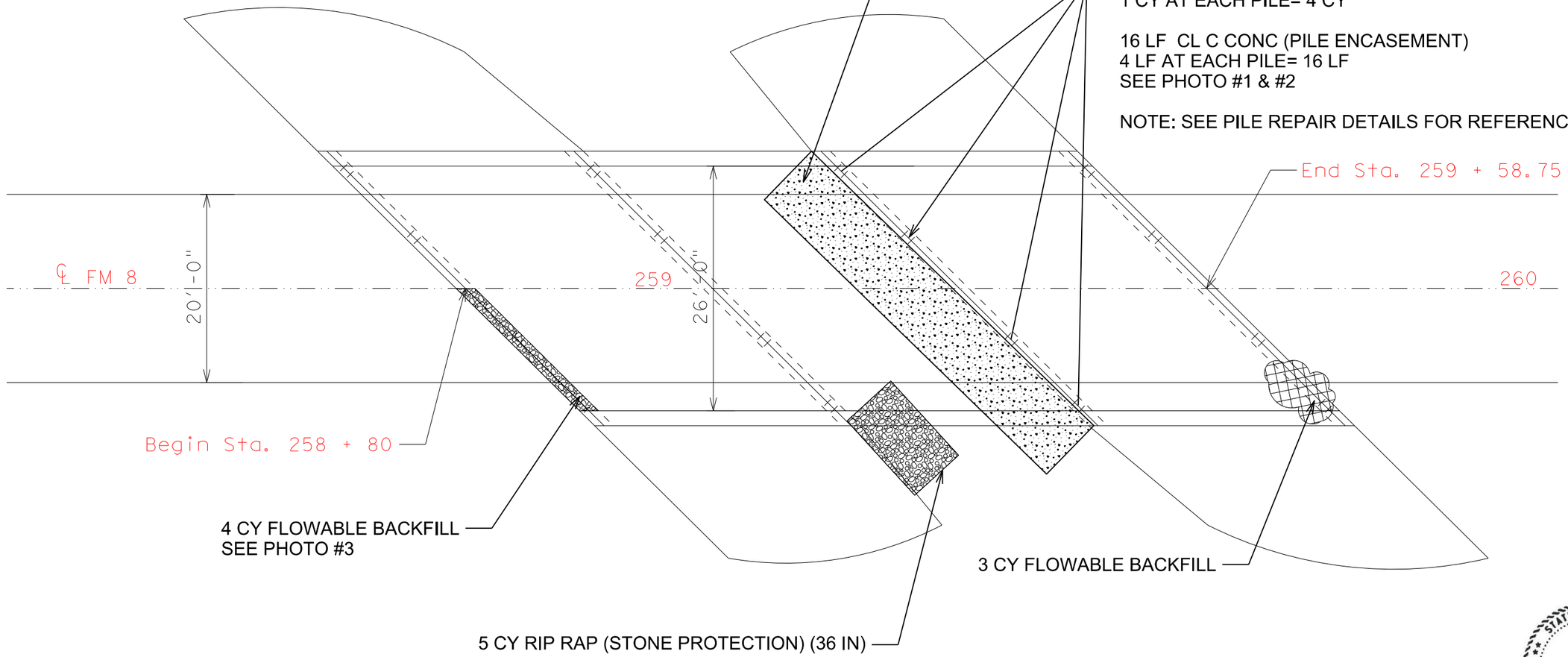
ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	7	CY
432	6037	RIP RAP (STONE PROTECTION) (36 IN)	30	CY
110	6002	EXCAVATION(CHANNEL)	4	CY
420	6158	CL C CONC(PILE ENCASEMENT)	16	LF



STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

FM 8 @
ELLISON CREEK
230680055001019
EASTLAND CO.

Sta. 258+80 - 259+58.75
3 Simple Span Reinforced Concrete Flat Slab Bridge
On Steel Pile Bents

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		49

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NORTHEAST INTERIOR BENT - LOOKING NORTHEAST VIEW 1440

NOTE: MODERATE TO SEVERE PITTING AND LAMINATE RUST AT BASE OF NORTHWEST STEEL PILE BELOW COLLAR. FLANGE WIDTH REDUCED TO 5/16" FROM 7/16" THICK.

PHOTO #1

NORTHEAST INTERIOR BENT - LOOKING EAST VIEW 1439

NOTE: ADVANCED SCOUR 3' DEEP ALONG NORTHEAST INTERIOR BENT COLUMNS. SEVERAL LARGE FRACTURE CRACKS ALONG NORTHEAS RIPRAP.

PHOTO #2

SOUTHWEST RIPRAP - LOOKING SOUTHEAST VIEW 1441

NOTE: MODERATE UNDERMINING AT SOUTHEAST END OF SOUTHWEST ABUTMENT 8" DEEP AND 2' BACK.

PHOTO #3

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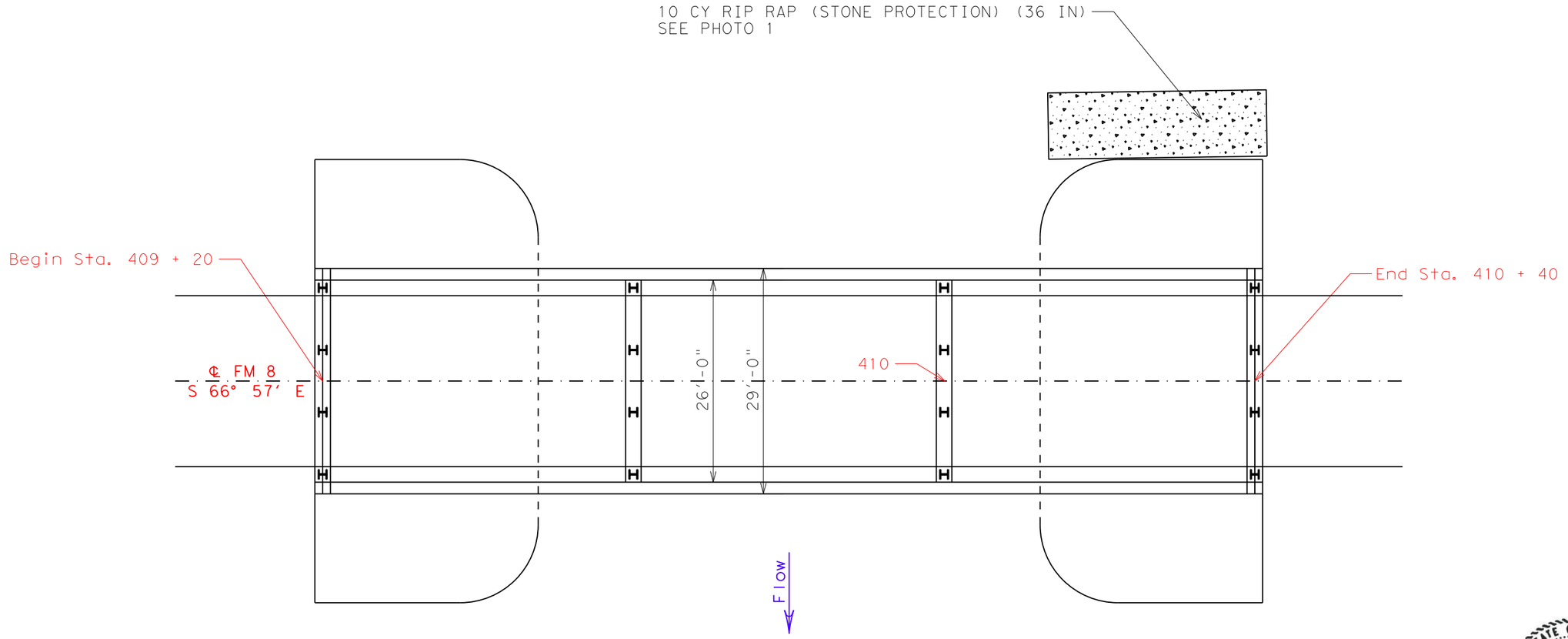
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		50

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6037	RIP RAP (STONE PROTECTION) (36 IN)	10	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	27	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF



NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 409+20 - 410+40
3 Simple Span Reinforced Concrete Pan Girder Bridge
On Steel Pile Bents

VIEW 6305

EAST CHANNEL BANK - LOOKING WEST

NOTE: EAST CHANNEL BANK HAS MODERATE EROSION ALONG EAST EMBANKMENT RIPRAP TOEWALL UP TO 42" DEEP.

PHOTO #1

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

09/03/2021

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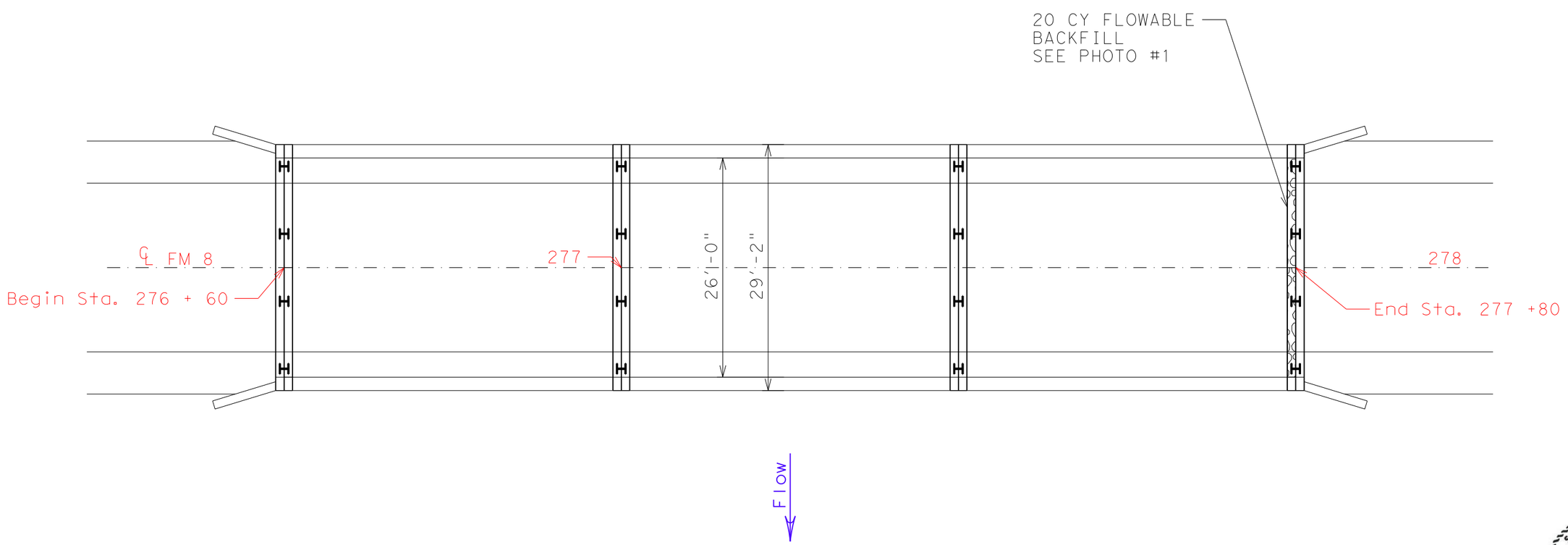
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		51

DATE: 8/31/2021 12:42:04 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 8 HOG CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	20	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	27	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF



NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 276+60 - 277+80
3 Simple Span Reinforced
Concrete Pan Girder Bridge
On Steel Pile Bents

NORTHEAST ABUTMENT - LOOKING EAST VIEW 1460

NOTE: MODERATE TO ADVANCED EROSION 2' DEEP AND 21" BACK ALONG NORTHEAST ABUTMENT.

PHOTO # 1

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

09/03/2021

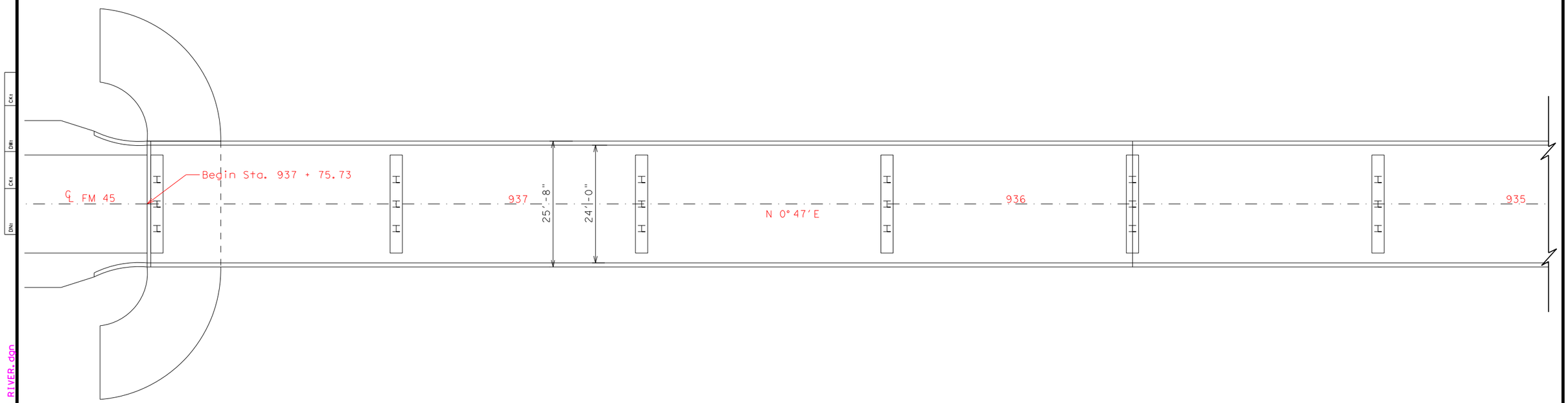
FM 8 @
LEON RIVER TRIBUTARY
230680055001021
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		52

DATE: 8/31/2021 12:49:06 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 8 LEON RIVER TRIBUTARY.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	385	LF



NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438.
USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

Sta. 937+75.73 - 928+94.25
14 Span Continuous Steel Beam Bridge
On Concrete Column & Steel Pile Bents

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
J.H. Scantling, P.E.

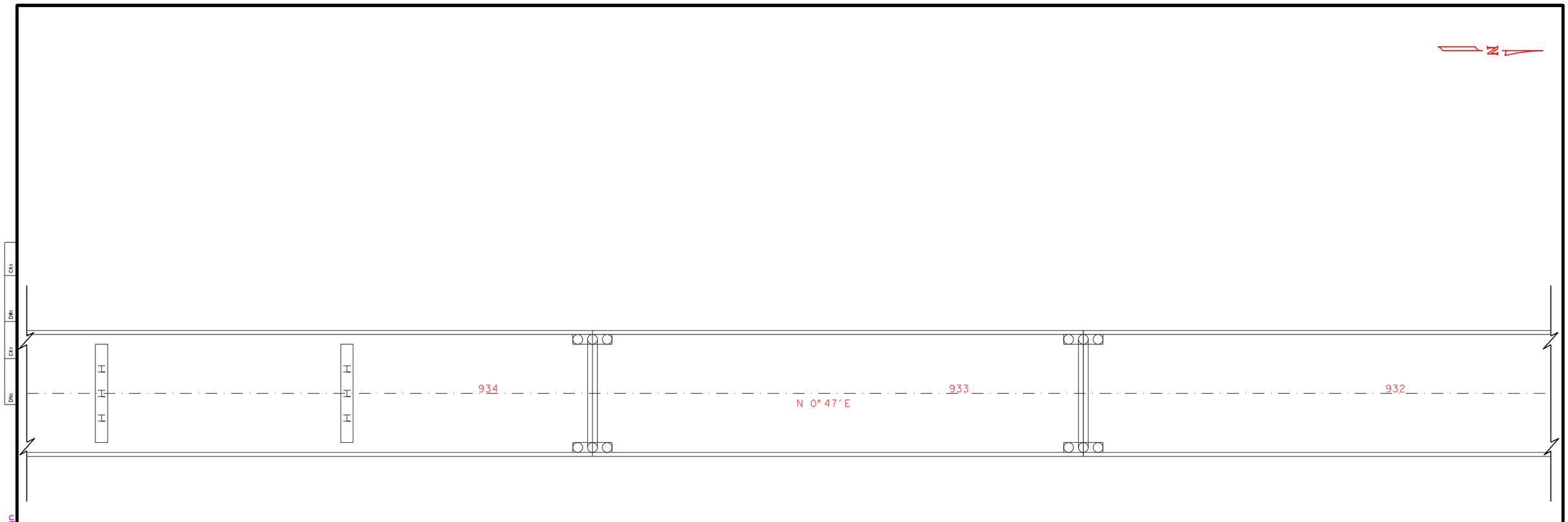
08/19/2021

FM 45 @ COLORADO RIVER
231670048007024
MILLS CO.

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		53

DATE: 8/18/2021 4:32:18 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 45 COLORADO RIVER.dgn



DATE: 8/18/2021 4:32:19 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 45 COLORADO RIVER.dgn

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JASON H. SCANTLING
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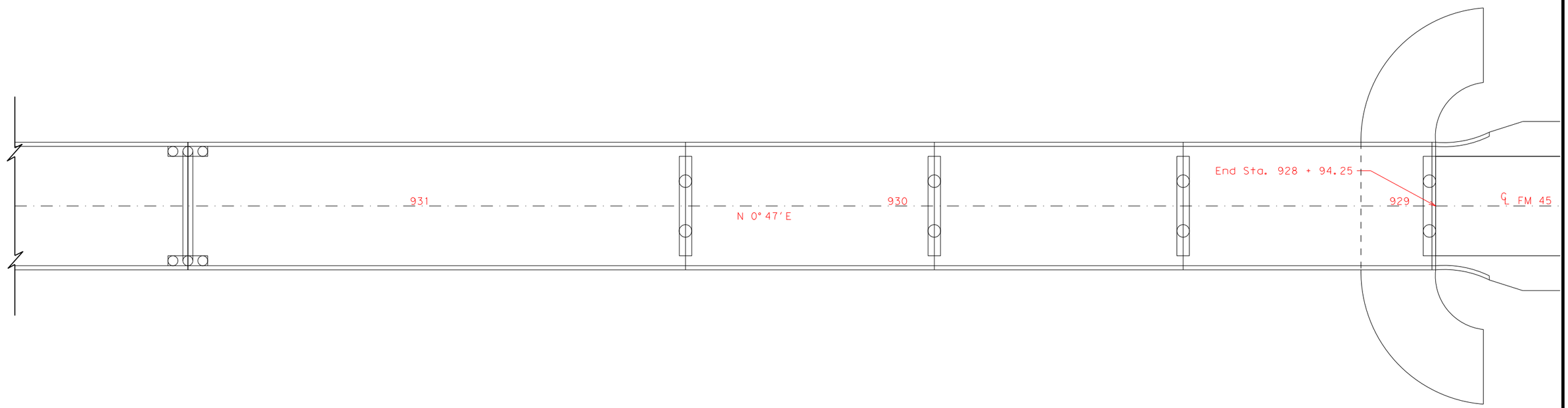
08/19/2021

FM 45 @ COLORADO RIVER
231670048007024
MILLS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		54



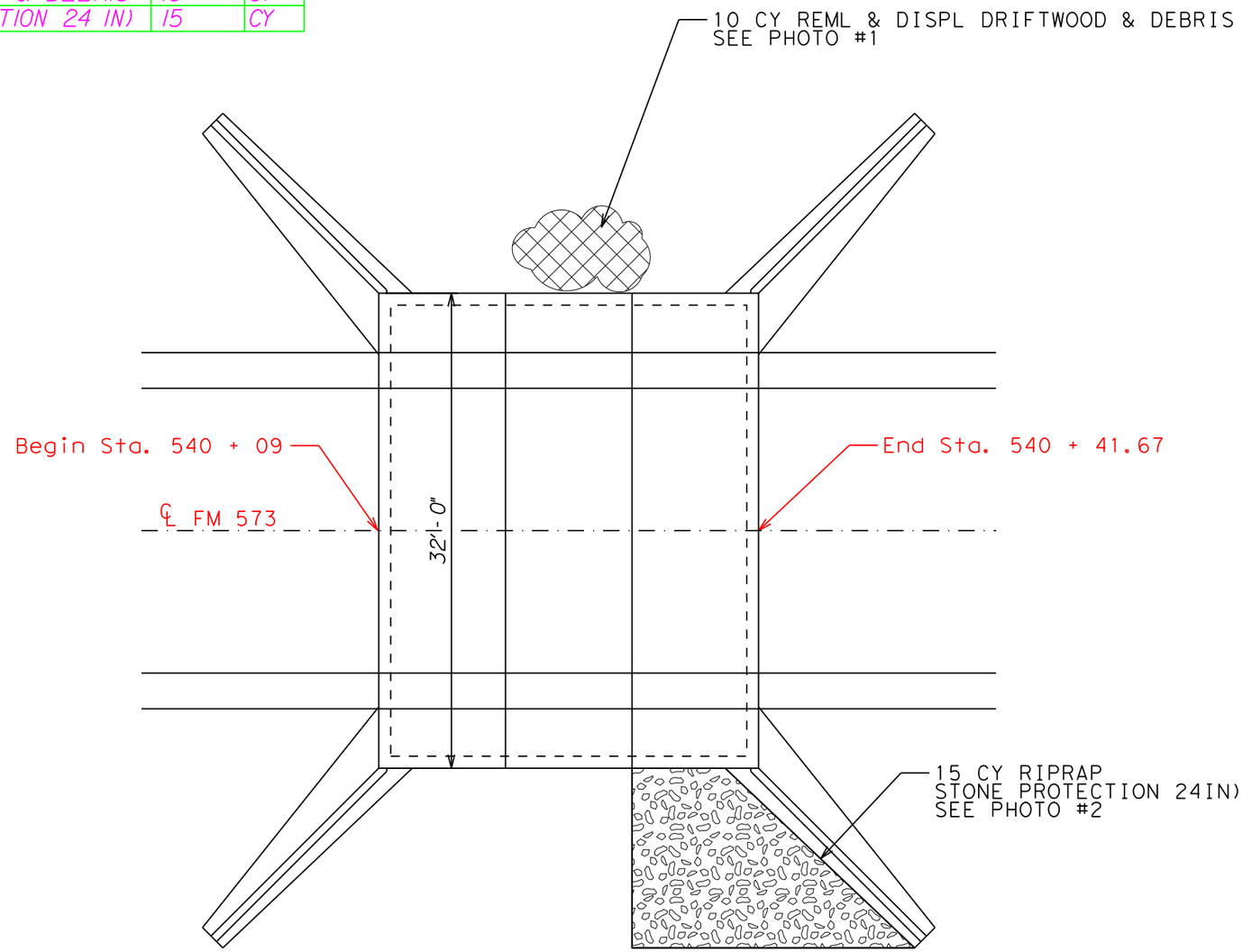
FM 45 @
COLORADO RIVER
231670048007024
MILLS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		55

DATE: 8/18/2021 4:32:19 PM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 45 COLORADO RIVER.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	10	CY
432	6035	RIP RAP (STONE PROTECTION 24 IN)	15	CY



Sta. 540+09 - 540+41.67
3 - 10' x 8'
Concrete Box Culvert

DRIFT UPSTREAM
END BARREL 1 & 2

Looking E

IMG. 0524

Note: Drift accumulation at the upstream end at barrels 1 and 2.

PHOTO #1

PHOTO #2

STATE OF TEXAS
JASON H. SCANTLING
96633
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PROFESSIONAL ENGINEER

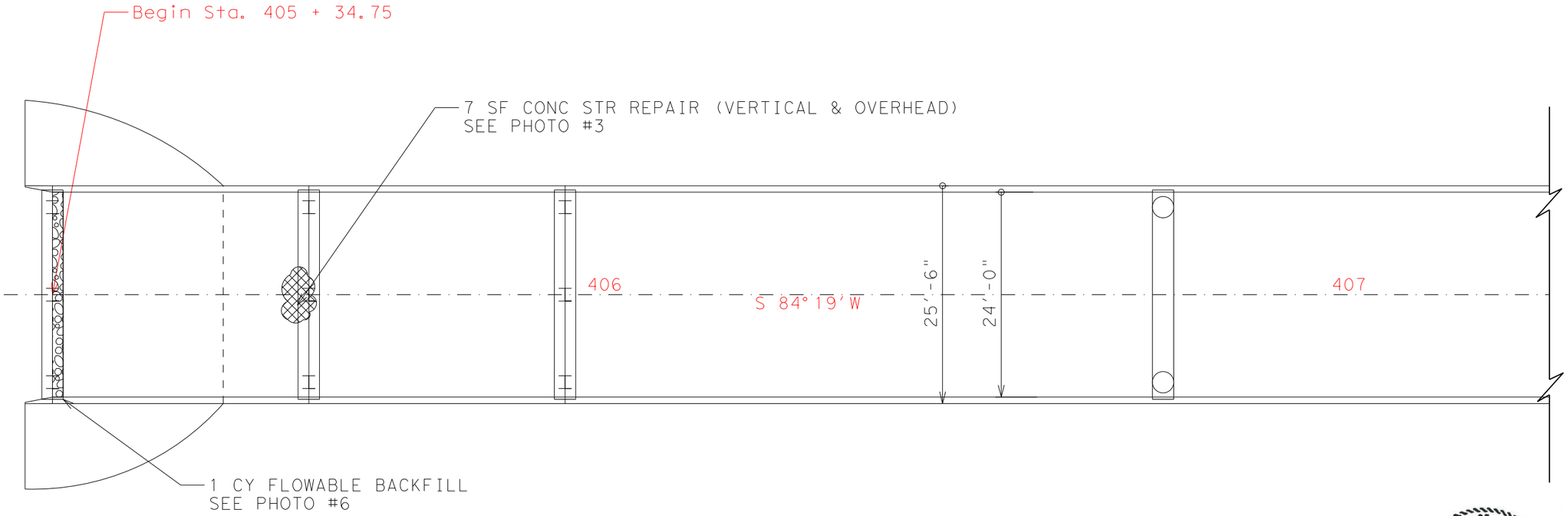
08/19/2021

FM 573 @
DRAW
230470102904007
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		56

DATE: 8/18/2021 4:32:21 PM
FILE: ...\FM 573 DRAW.dgn



NOTE: BEAMS, DIAPHRAGMS, BEARINGS, AND PILES SHALL BE SPOT CLEANED AND PAINTED IN ACCORDANCE WITH ITEM 446 UP TO 150 SF. SEE PHOTO #7 & #8

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 405+34.75 - 408+35.25
3 Continuous Steel Beam Span & Four Simple Span Reinforced Concrete Pan Girder On Concrete Column & Steel Pile Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
446	6028	SPOT CLEAN & PAINT EXIST STR(SPL PRT SYS)	1	LS
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	12	SF
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	10	CY
401	6001	FLOWABLE BACKFILL	2	CY
110	6002	EXCAVATION(CHANNEL)	4	CY
420	6158	CL C CONC(PILE ENCASEMENT)	15	LF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	24	EA
427	6006	EPOXY WATERPROOF FINISH	160	SF

STATE OF TEXAS
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09/03/2021

FM 574 @
PECAN BAYOU
231670102801004
MILLS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		57

DATE: 8/31/2021 12:03:37 PM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 574 PECAN BAYOU.dgn

4 CY EXCAVATION(CHANNEL)
NOTE:1 CY FOR EACH PILE=4 CY
15 LF CL C CONC(PILE ENCASEMENT)
NOTE:5 LF FOR EACH PILE=15 CY
SEE PHOTO #7 & #8

SEE PILE REPAIR DETAIL FOR REFERENCE

10 CY REML & DISPL DRIFTWOOD & DEBRIS
SEE PHOTO #1

1 CY FLOWABLE BACKFILL
SEE PHOTO #5

End Sta. 408 + 35.25

408

S 84°19'W

4 SF CONC STR REPAIR (VERTICAL & OVERHEAD)
SEE PHOTO #4

1 SF CONC STR REPAIR (VERTICAL & OVERHEAD)
SEE PHOTO #2

N

CK:
DW:
CK:
DN:

DATE: 8/18/2021 4:32:23 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 574 PECAN BAYOU.dgn

STATE OF TEXAS
JASON H. SCANTLING
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08/19/2021

FM 574 @
PECAN BAYOU
231670102801004
MILLS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		58

EAST CHANNEL BANK - LOOKING EAST VIEW 8435

NOTE: ADVANCED DRIFT HAS ACCUMULATED ALONG EAST CHANNEL BANK AND BENT 4 FROM EAST.
THE SPALL WITH EXPOSED REBAR ON NORTH COLUMN FROM PREVIOUS REPORT IS BEING COVERED BY DRIFT.

PHOTO #1

BENT CAP 2 - LOOKING NORTHEAST VIEW 8421

NOTE: MODERATE DELAMINATIONS ON BENT CAP 2 FROM EAST.
MODERATE SPALLS WITH EXPOSED REBAR IN DIAPHRAGM OVER BENT 2.

PHOTO #2

BENT CAP 7 - LOOKING EAST VIEW 8431

NOTE: MODERATE DELAMINATION ON BENT CAP 7 FROM EAST.

PHOTO #3

BENT 3 - LOOKING NORTHEAST VIEW 8423

NOTE: MODERATE SPALL WITH EXPOSED REBAR AND HONEYCOMB SPALLING IN SOUTH END OF BENT CAP 3 FROM EAST.
MODERATE RUST AT BEAM ENDS AND BEARINGS.

PHOTO #4

EAST ABUTMENT RIPRAP - LOOKING SOUTHEAST VIEW 8428

NOTE: EAST ABUTMENT RIPRAP HAS SLID 1" TOWARD CHANNEL.

PHOTO #5

SOUTH EXTERIOR PAN GIRDER - LOOKING NORTHWEST VIEW 8430

NOTE: MODERATE DIAGONAL CRACK IN SOUTH EXTERIOR BEAM OVER WEST ABUTMENT CAP.
WEST ABUTMENT CAP HAS MINOR UNDERMINING.

PHOTO #6

STEEL PILES AT BENT 6 - LOOKING SOUTHWEST VIEW 8434

NOTE: STEEL PILES AT BENT 6 FROM EAST HAVE MINOR FLAKING RUST ON LOWER PORTIONS.

PHOTO #7

CENTER PILE AT BENT 6 - LOOKING EAST VIEW 8437

NOTE: CENTER PILE OF BENT 6 FROM EAST HAS MODERATE LAMINATE RUST AT BASE, ESTIMATE 10% SECTION LOSS.

PHOTO #8

DN: CK: DW: CK:

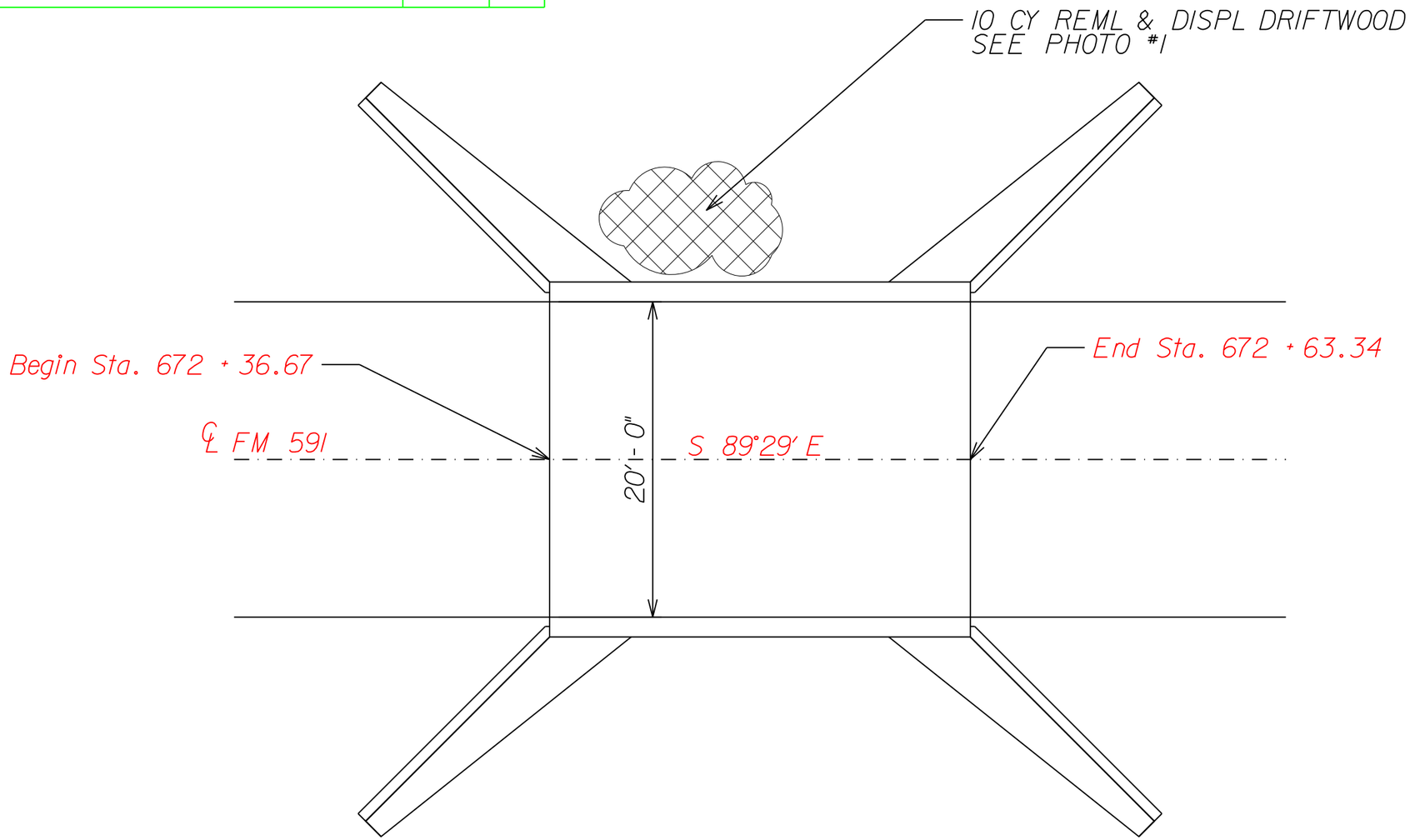
DATE: 8/18/2021 4:32:24 PM
FILE: T:\BWD\DGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 574 PECAN BAYOU.dgn

FM 574 @
PECAN BAYOU
231670102801004
MILLS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		59

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	10	CY



DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-01
STR: 007

DRIFT UPSTREAM
END BARREL 1

Looking S

IMG. 0673

Note: Approx. 2' of drift is caught at upstream end of barrel 1.

PHOTO #1

Sta. 672+36.67 - 672+63.34
3 - 8' x 8'
Reinforced Concrete Box Culvert
With Cast In Place Wingwalls

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS, P.E.

08/19/2021

FM 591 @
MILL CREEK
230470103901007
COMANCHE CO.

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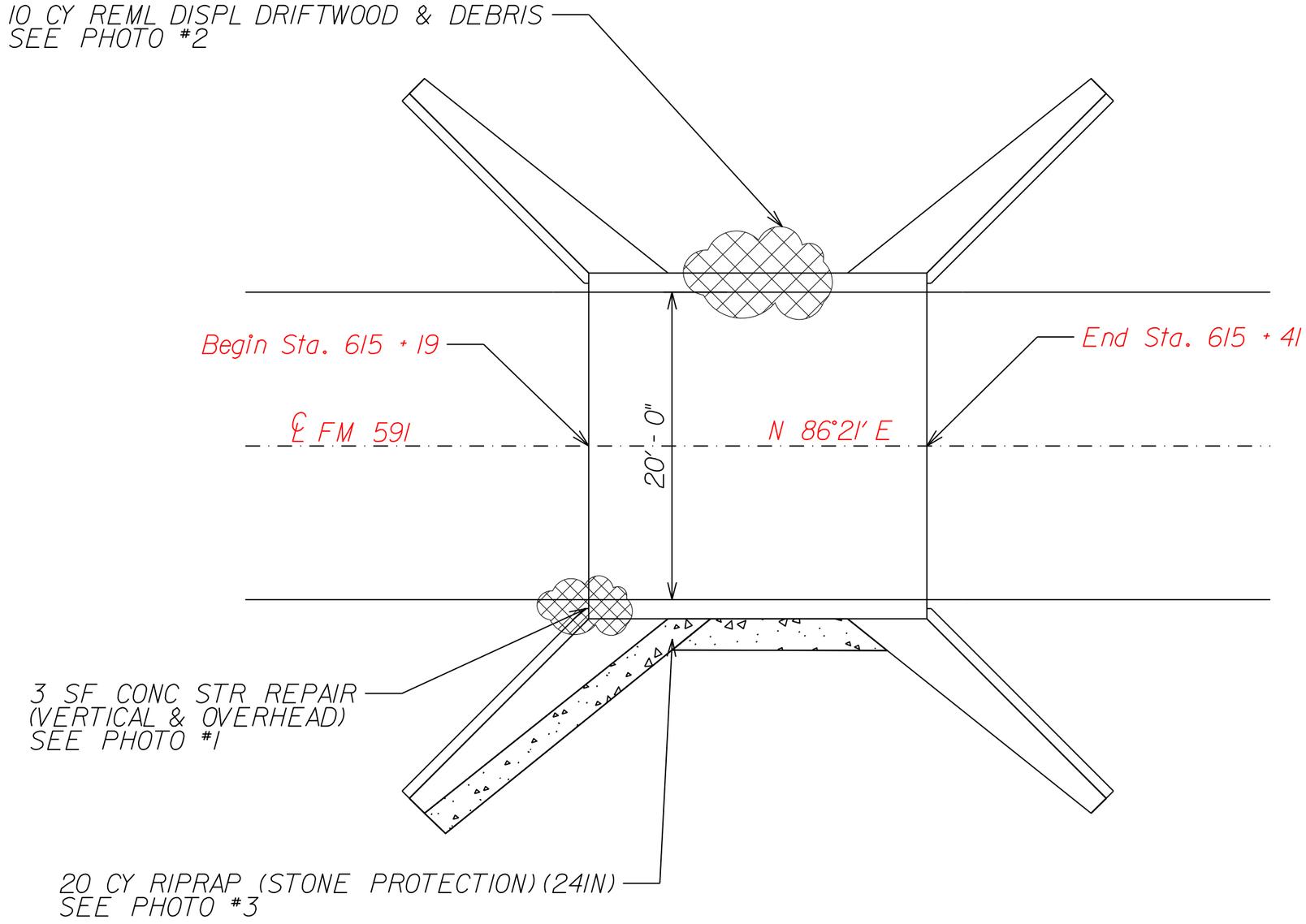
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		60

DATE: 8/18/2021 4:32:26 PM
FILE: ...\FM 591 MILL CREEK.dgn



Sta. 615+19 - 615+41
2 - 10' x 10'
Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML DISPL DRIFTWOOD & DEBRIS	10	CY
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	20	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	3	SF

STATE OF TEXAS
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08/19/2021

FM 591 @
WEST JOPLIN CREEK
230470103901006
COMANCHE CO.

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CONT	SECT	JOB	HIGHWAY
0923	00	064	FM 591
DIST	COUNTY		SHEET NO.
23	COMANCHE		61

DATE: 8/18/2021 4:32:27 PM
FILE: ...\FM 591\WEST JOPLIN CREEK.dgn

SPALLED
HEADWALL SW
CORNER

Looking NE

IMG. 0682

Note: The headwall has spalled area with rebar exposed on the SW corner.

PHOTO #1

DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-01
STR: 006

DRIFT BUILDUP
UPSTREAM END

Looking SE

IMG. 0684

Note: Drift of approx. 3' high caught at upstream end of interior wall.

PHOTO #2

CHANNEL BED
SCOUR
DOWNSTREAM END

Looking NW

IMG. 0685

Note: Channel bed scour has exposed up to 1.5' of culvert and wingwall footing.

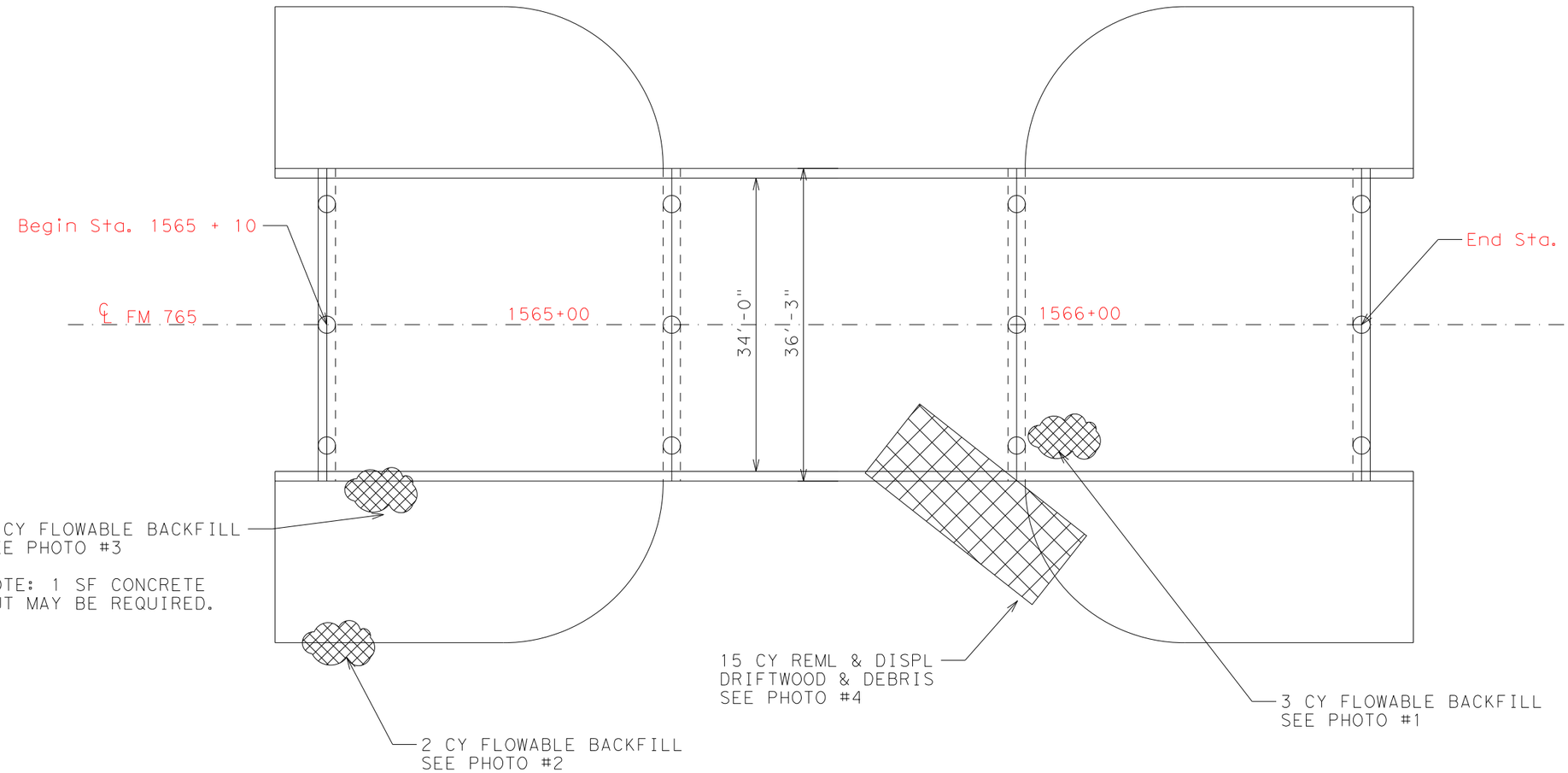
PHOTO #3

DATE: 8/18/2021 4:32:28 PM
FILE: ...\FM 591WEST JOPLIN CREEK.dgn

FM 591
WEST JOPLIN CREEK
230470103901006
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		62



NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 1565+10 - 1566+30
3 Simple Span Reinforced Concrete Pan Girder Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	8	CY
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	15	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	33	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF

STATE OF TEXAS
JASON H. SCANTLING
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09/03/2021

FM 765 @ DEEP CREEK
231600087006032
MCCULLOCH CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		63

DATE: 8/31/2021 12:09:03 PM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 765 DEEP CREEK.dgn

DN: | CK: | DW: | CK:

SOUTHEAST EMBANKMENT RIPRAP - LOOKING EAST VIEW 2159

NOTE: SOUTHEAST EMBANKMENT RIPRAP HAS SETTLED UP TO 0.5" AND HAS SLID TOWARD CHANNEL.

PHOTO #1

SOUTHWEST EMBANKMENT RIPRAP - LOOKING EAST VIEW 2149

NOTE: EROSION ALONG SOUTHWEST EMBANKMENT RIPRAP UP TO 19" DEEP.

PHOTO #2

SOUTHWEST EMBANKMENT RIPRAP - LOOKING NORTH VIEW 2150

NOTE: SOUTHWEST EMBANKMENT RIPRAP HAS MODERATE CRACKS AND HAS SETTLED UP TO 3" DEEP NEAR SOUTH END OF WEST ABUTMENT CAP.

PHOTO #3

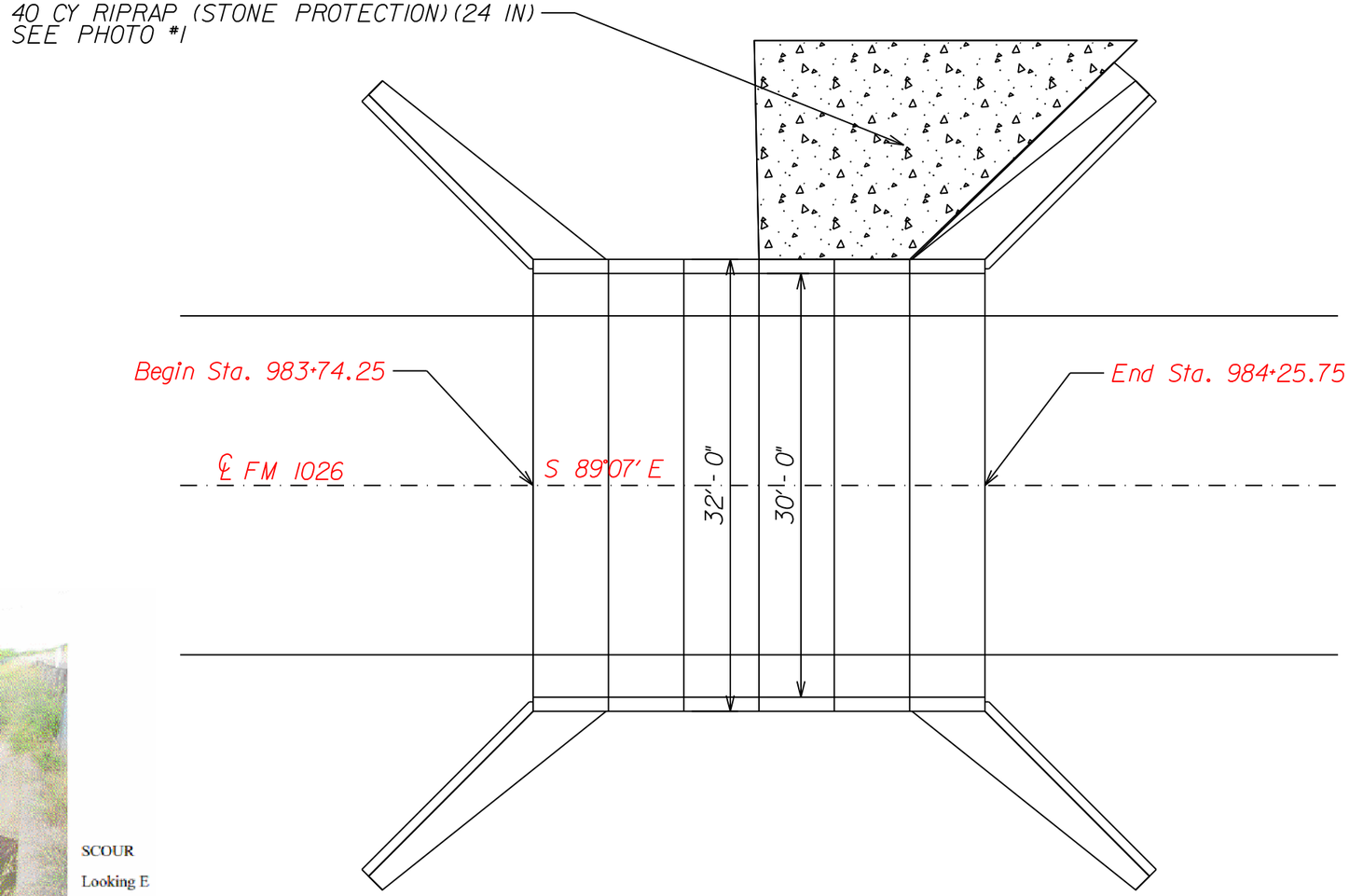
PHOTO #4

FM 765 @
DEEP CREEK
231600087006032
MCCULLOCH CO.

CONT	SECT	JOB	HIGHWAY
0923	00	064	FM 765
DIST	COUNTY		SHEET NO.
23	MCCULLOCH		64

DATE: 8/18/2021 4:32:30 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 765 DEEP CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION)(24 IN)	40	CY



SCOUR
Looking E

IMG. 236

Note: Large scour hole in front of 2 east barrels.

PHOTO #1

Sta. 983+74.25 - 984+25.75
6 - 8' x 4'
Concrete Box Culvert

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

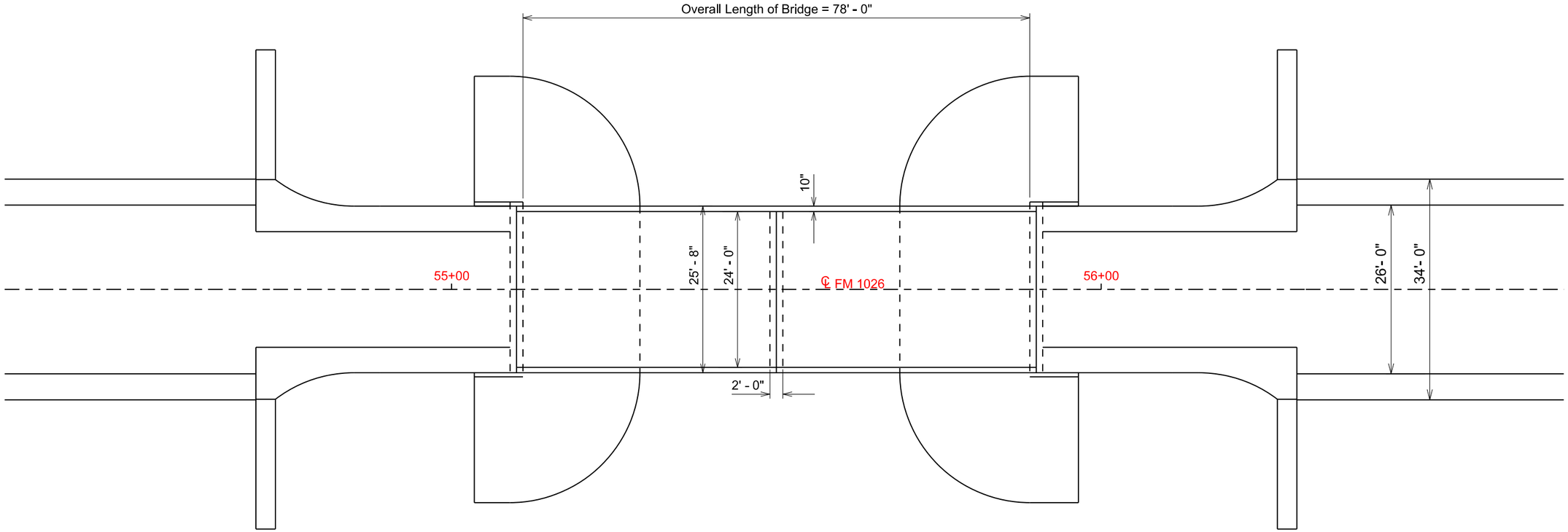
08/19/2021

FM 1026 @
DRAW
230420110402007
COLEMAN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		65

DATE: 8/19/2021 11:01:05 AM
FILE: ...\FM 1026 DRAW.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	32	EA
427	6006	EPOXY WATERPROOF FINISH	80	SF



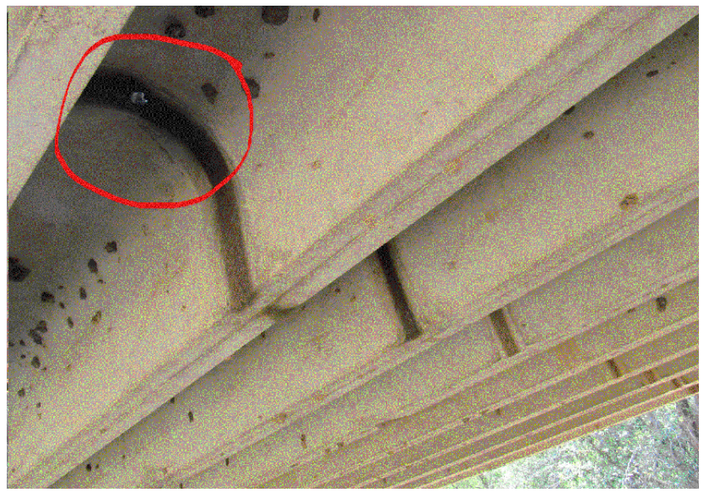


PHOTO #1

Sta. 55+10 - Sta. 55+90
2 - 40' - 0" Conc. Slab & Girder Spans

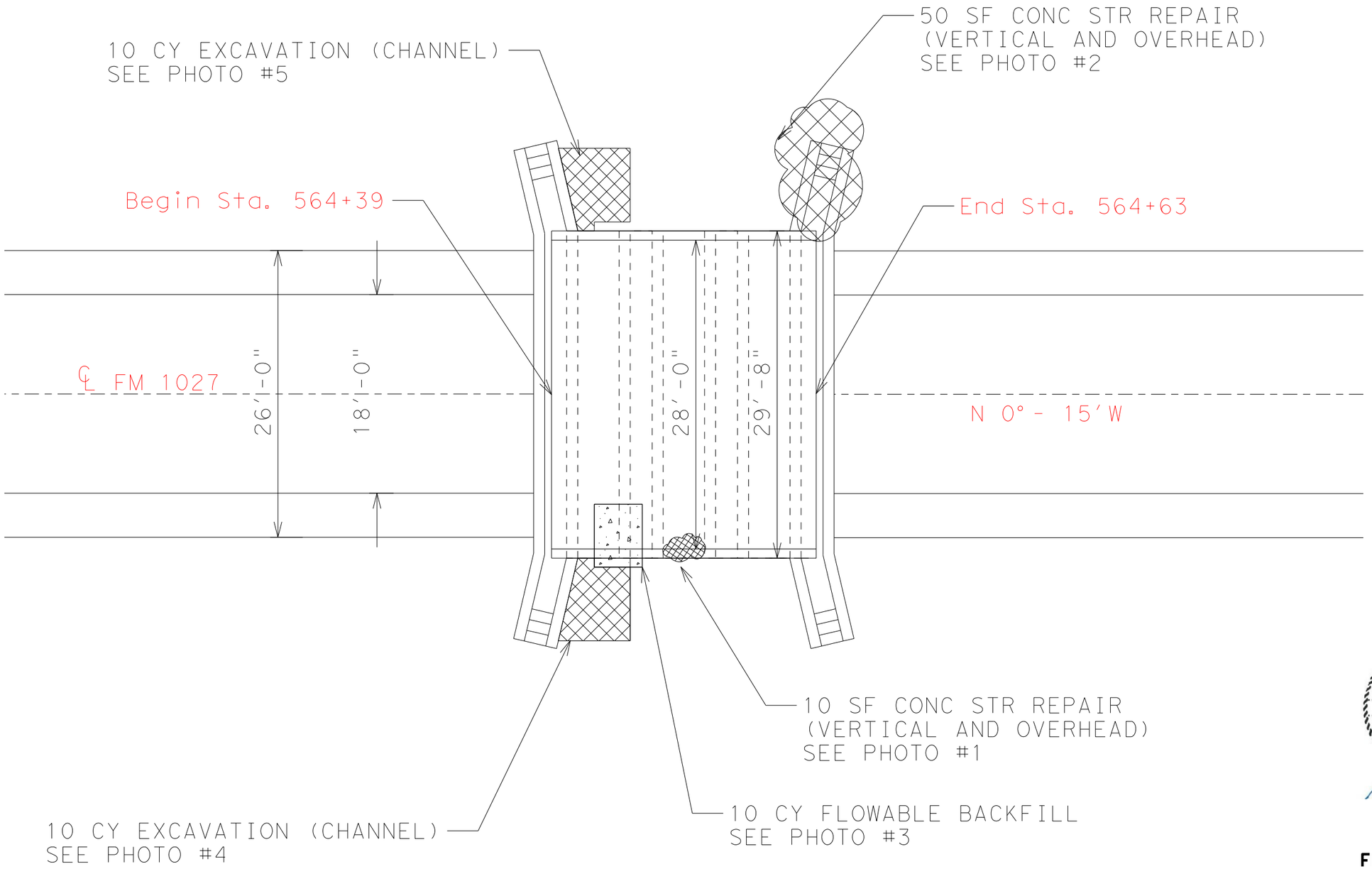
STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

09/03/2021

FM 1026 @
WILDCAT CREEK
23042110401010
COLEMAN CO

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		66

DATE: 8/31/2021 11:19:01 AM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1026 WILDCAT CREEK.dgn



ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	60	SF
401	6001	FLOWABLE BACKFILL	10	CY
438	6001	CLEAN EXIST CULVERTS	1	EA
110	6002	EXCAVATION (CHANNEL)	20	CY

Sta. 564+39 - 564+63
Reinf. Conc Slab with Masonry Walls & Wings

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

FM 1027 @ DRAW
230680123901006
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		67

DATE: 8/18/2021 4:32:37 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1027 DRAW.dgn

CENTER SPAN SOFFIT - LOOKING NORTHWEST VIEW 771

NOTE: MODERATE HONEYCOMBING IN EAST END OF CENTER SPAN SOFFIT WITH SPOT EXPOSED REBAR.

PHOTO #1

NORTHWEST WINGWALL - LOOKING NORTHEAST VIEW 773

NOTE: PARTIAL COLLAPSE OF TOP 3 LAYERS OF NORTHWEST WINGWALL. COLLISION DAMAGE HAS BROKEN END OF CONCRETE CURB.

PHOTO #2

VIEW 770

SOUTH INTERIOR BENT - LOOKING NORTHWEST

NOTE: SOUTH INTERIOR BENT FOOTING EXPOSED 1' DEEP.

PHOTO #3

PHOTO #4

PHOTO #5

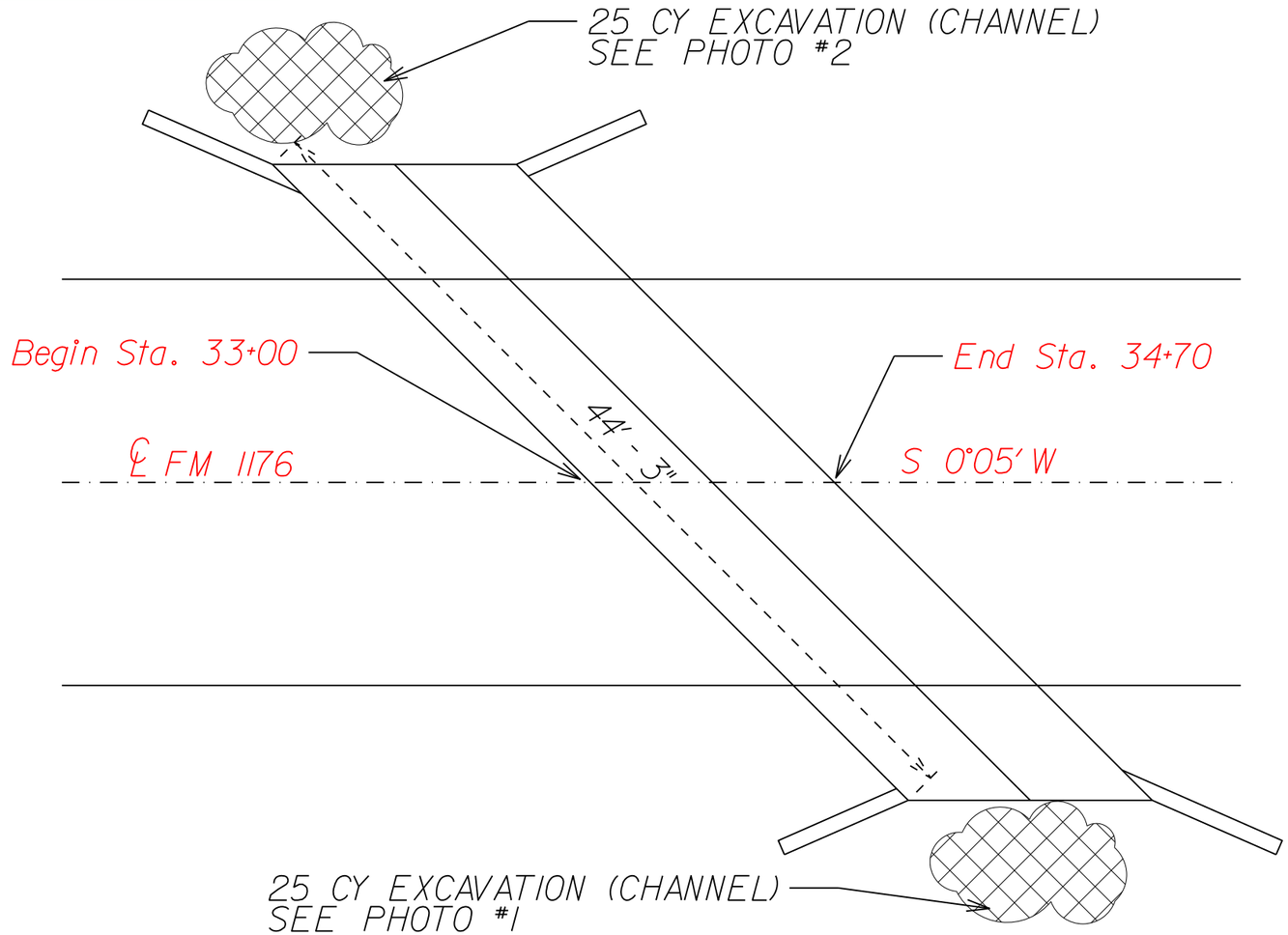
Sta. 564+39 - 564+63
Reinf. Conc Slab with Masonry Walls & Wings

FM 1027 @ DRAW
230680123901006
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		68

DATE: 8/18/2021 4:32:37 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1027 DRAW.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
480	6001	CLEAN EXIST CULVERTS	1	EA
110	6002	EXCAVATION (CHANNEL)	50	CY



Sta. 33+00 34+70
2 - 10' x 6' Concrete Box Culvert

ELEVATION VIEW
Looking NE
IMG. 0019

Note: Sediment and vegetation buildup in upstream channel.

PHOTO #1

DATE: 14 JUL 2019
COUNTY: 042
CONT-SEC: 1365-01
STR: 006

STREAM VIEW
Looking SW
IMG. 0020

Note: Sediment and vegetation buildup in downstream channel.

PHOTO #2

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

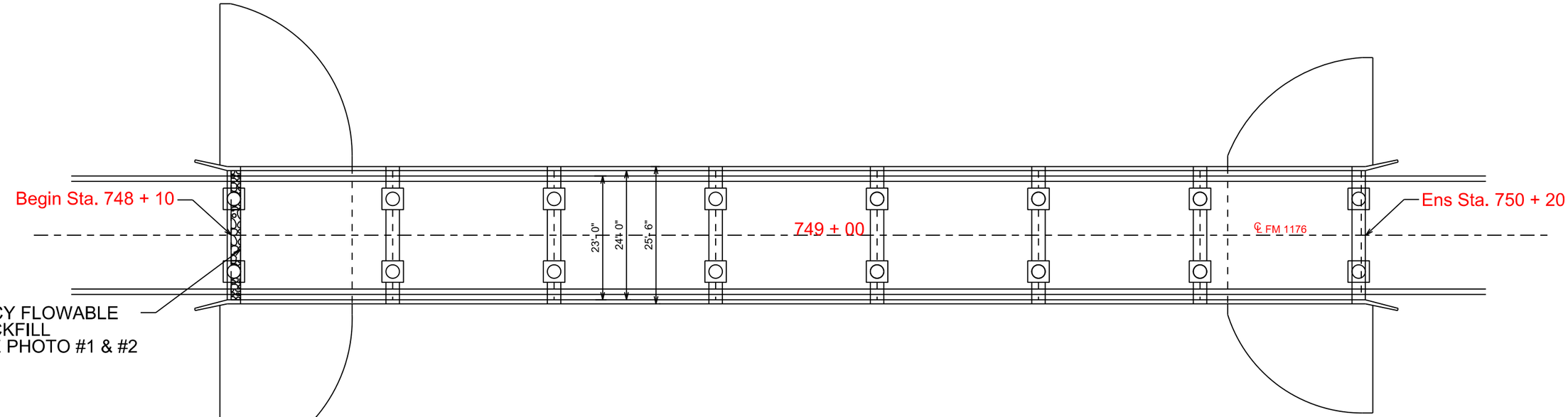
08/19/2021

FM 1176 @
DRAW
230420136501006
COLEMAN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		69

DATE: 8/18/2021 4:32:39 PM
FILE: ...\FM 1176 DRAW .dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	20	CY



Sta. 748+10 - 750+20
7-span simple concrete pan girder
on concrete substructure bridge

EROSION
Looking SW

IMG. 132

Note: Erosion at rip rap for the SW abutment.

PHOTO #1

DATE: 10 JULY 2019
COUNTY: 042
CONT-SEC: 1365-03
STR: 003

UNDERMINING
Looking SW

IMG. 133

Note: Undermining at SW abutment cap.

PHOTO #2

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

FM 1176 @
MUKEWATER CREEK
23042136503003
COLEMAN CO.

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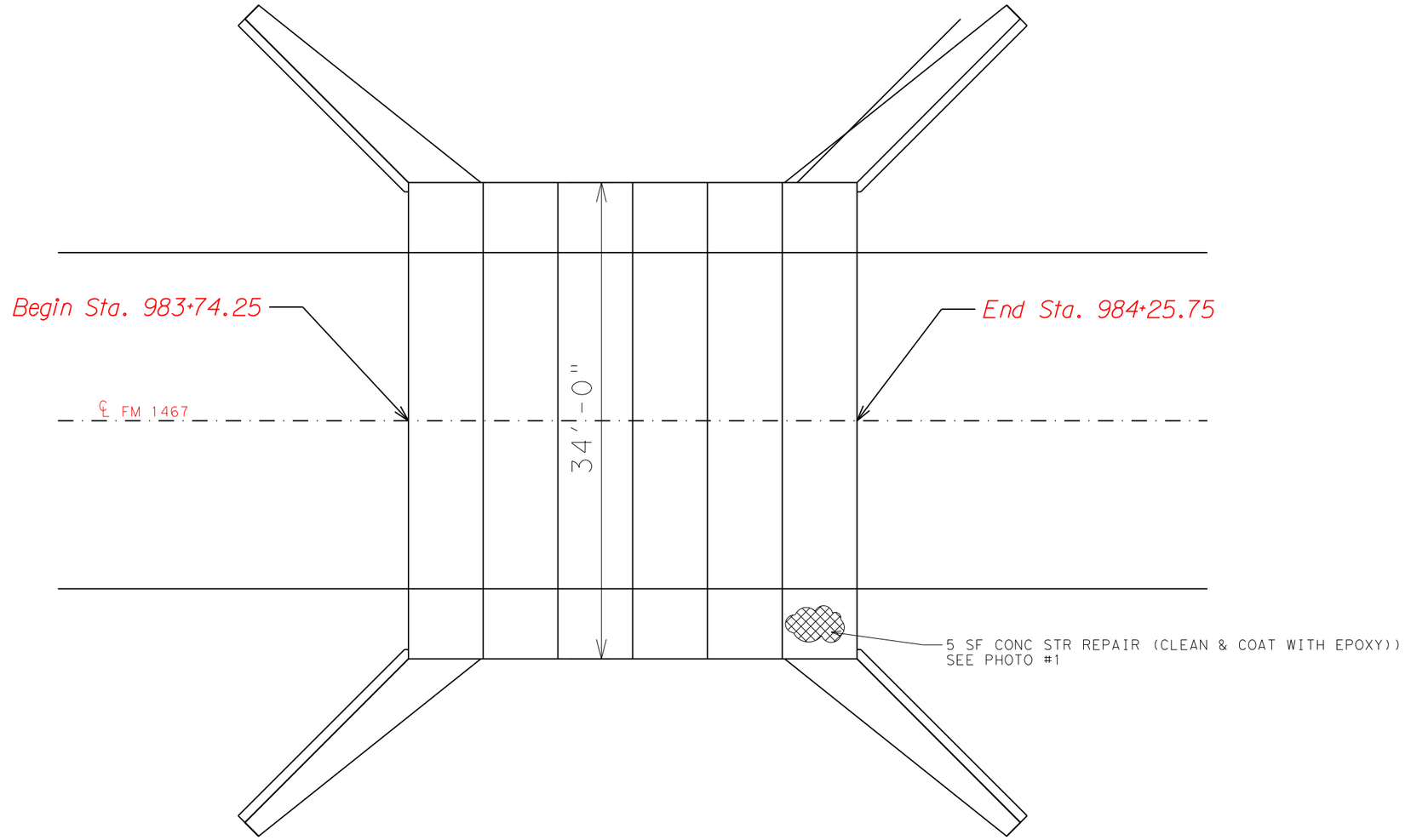
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		70

DATE: 8/18/2021 4:32:41 PM
FILE: I:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1176 MUKEWATER CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WITH EPOXY)	5	SF



SOUTH BARREL - LOOKING SOUTHEAST VIEW 1586

NOTE: MODERATE TO SEVERE SPALLS WITH EXPOSED CORRODED REBAR IN WEST END OF SOUTH BARREL TOP SLAB SOFFIT.

PHOTO #1

Sta. 983+74.25 - 984+25.75
6 Barrel 8' x 4' Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

FM 1467 @
BLANKET CREEK
230250103802006
BROWN CO.

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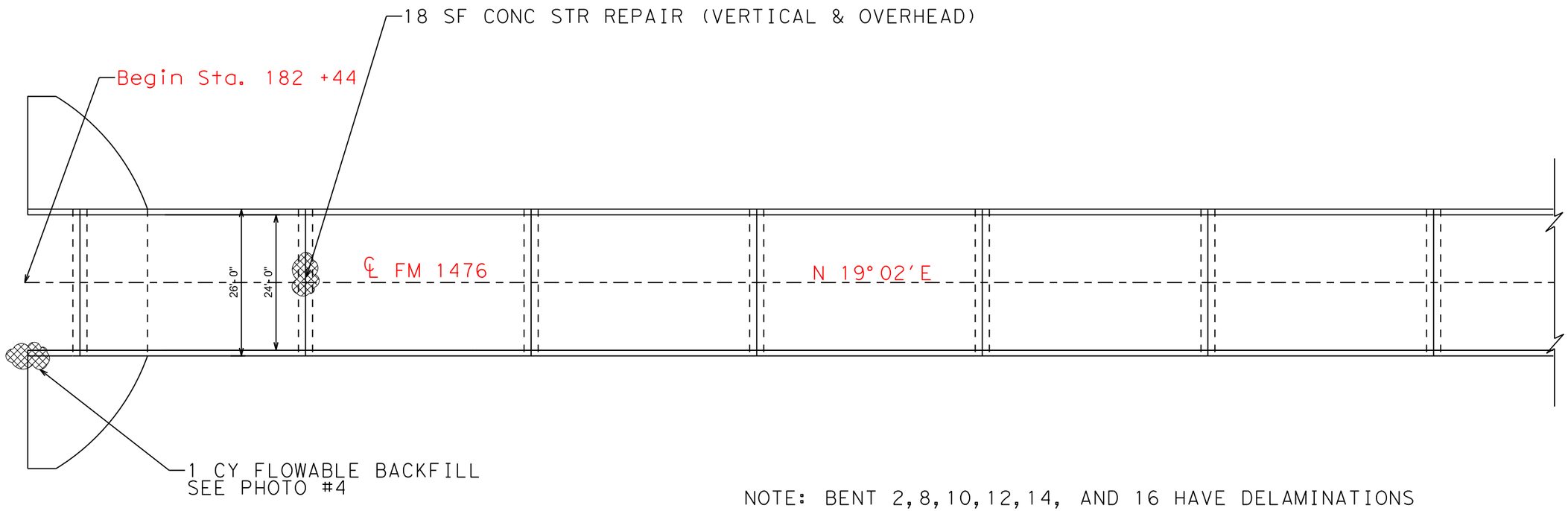
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		71

DATE: 8/18/2021 4:32:42 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1467 BLANKET CREEK.dgn



NOTE: BENT 2, 8, 10, 12, 14, AND 16 HAVE DELAMINATIONS

NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	2	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	117	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	128	EA
427	6006	EPOXY WATERPROOF FINISH	640	SF

Sta. 182+44 - 188+84
16-Span Simple Reinforced Concrete Pan Girder
Bridge On Steel Pile Bents

STATE OF TEXAS
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09/03/2021

FM 1476 @
LEON RIVER RELIEF
230470103902013
COMANCHE CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		72

DATE: 8/31/2021 11:34:28 AM
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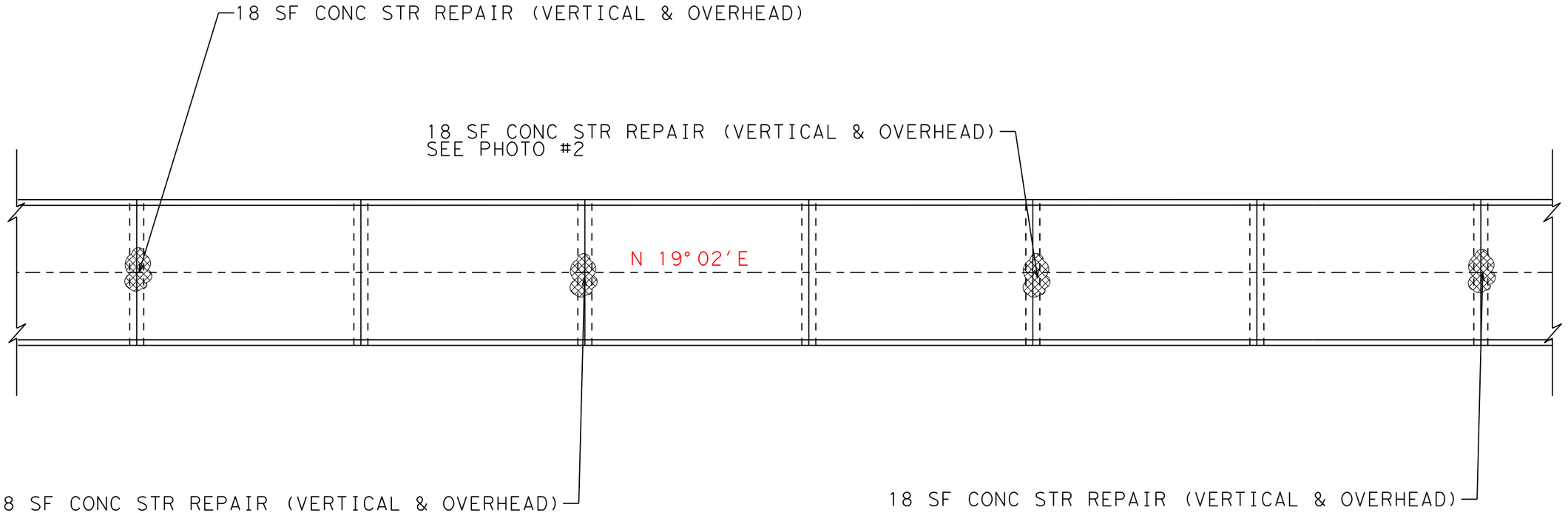

STATE OF TEXAS
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08/19/2021

FM 1476 @
LEON RIVER RELIEF
230470103902013
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		73

DATE: 8/18/2021 4:32:44 PM
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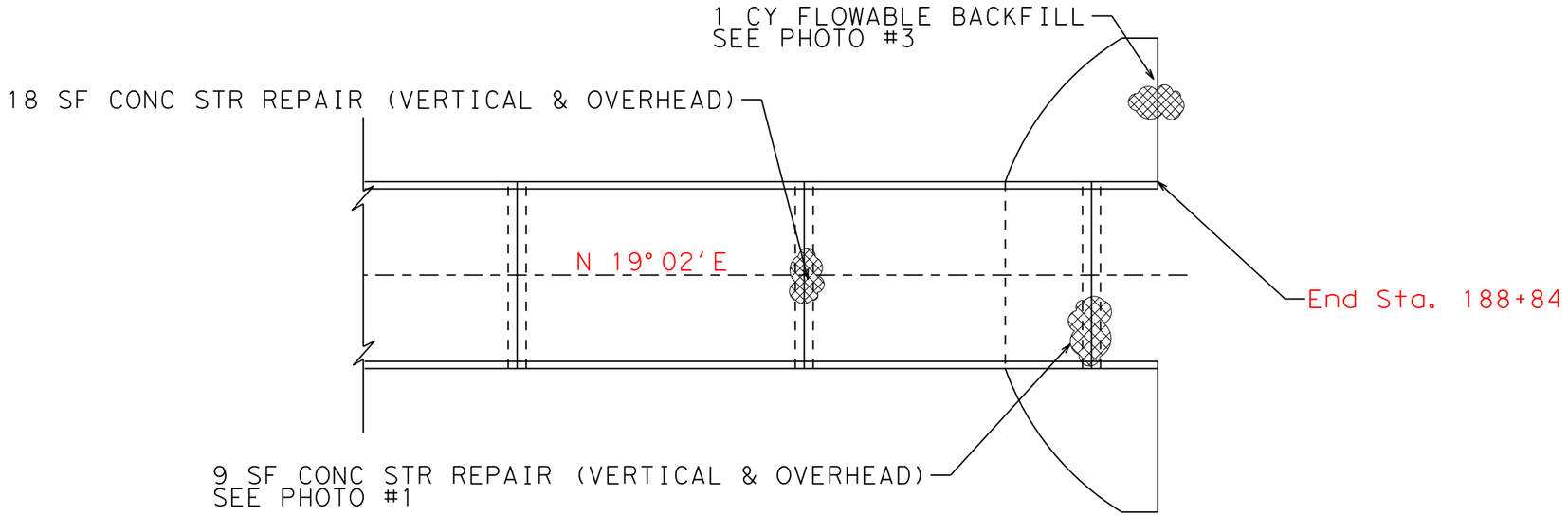

STATE OF TEXAS
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PROFESSIONAL ENGINEER

08/19/2021

FM 1476 @
LEON RIVER RELIEF
230470103902013
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		74

DATE: 8/18/2021 4:32:44 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1476 LEON RIVER RELIEF.dgn

DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-02
STR: 013

LARGE SPALL N ABUTMENT CAP

Looking N

IMG. 0711

Note: North abutment cap has a large spall approx. 6'x 1.5' with exposed rebar at the East end.

PHOTO #1

DELAMINATIONS ON CAP BENT 12

Looking S

IMG. 0713

Note: The caps at Bent 2, 8, 10, 12, 14, and 16 have delaminations measuring up to 1.5'x 12'.

PHOTO #2

DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-02
STR: 013

UNDERMINING OF RIPRAP NE CORNER

Looking SE

IMG. 0694

Note: Embankment erosion has undermined top of riprap at NE corner up to 1' below and 6' back beneath over a 9' length.

PHOTO #3

EMBANKMENT EROSION SW CORNER

Looking NW

IMG. 0698

Note: Embankment erosion at SW wingwall has undermined wingwall and riprap up to 2.

PHOTO #4

FM 1476 @
LEON RIVER RELIEF
230470103902013
COMANCHE CO.

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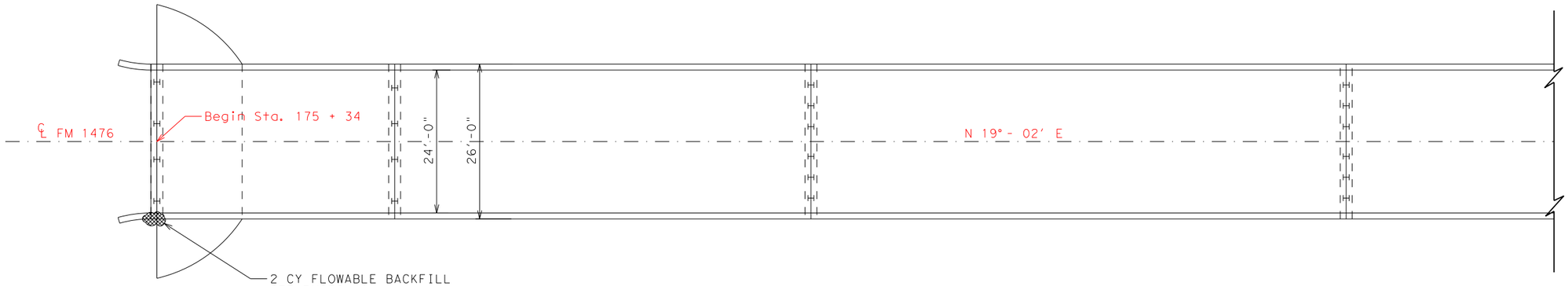
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		75

DATE: 8/18/2021 4:32:45 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1476 LEON RIVER RELIEF.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
446	6010	CLEAN & PAINT EXIST STR (SYSTEM I-A)	1	LS
401	6001	FLOWABLE BACKFILL	3	CY
429	6023	CONC STR REPAIR(PAN GIRDER HOLE REPR)	168	EA
427	6006	EPOXY WATERPROOF FINISH	360	SF



NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

NOTE: BEAMS, DIAPHRAGMS, AND BEARINGS SHALL BE SPOT CLEANED AND PAINTED IN ACCORDANCE WITH ITEM 446 UP TO 300 SF.

Sta. 175+34 - 180+04
3 Span Continuous Steel Unit on Concrete Pipes & 6 Simple Reinforced Concrete Pan Girder Spans On Steel Pile bents

DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-02
STR: 014

UNDERMINING
RIPRAP SE CORNER
Looking N

IMG. 0704

Note: Embankment erosion has undermined top of concrete riprap at SE corner approx. 3'.

PHOTO #1

DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-02
STR: 014

UNDERMINING
RIPRAP NE CORNER
Looking SE

IMG. 0700

Note: Embankment erosion has undermined top of concrete riprap at NE corner approx. 2', causing the top corner of riprap to break away.

PHOTO #2

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09/03/2021

FM 1476 @
LEON RIVER
230470103902014
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		76

DATE: 8/31/2021 11:25:25 AM
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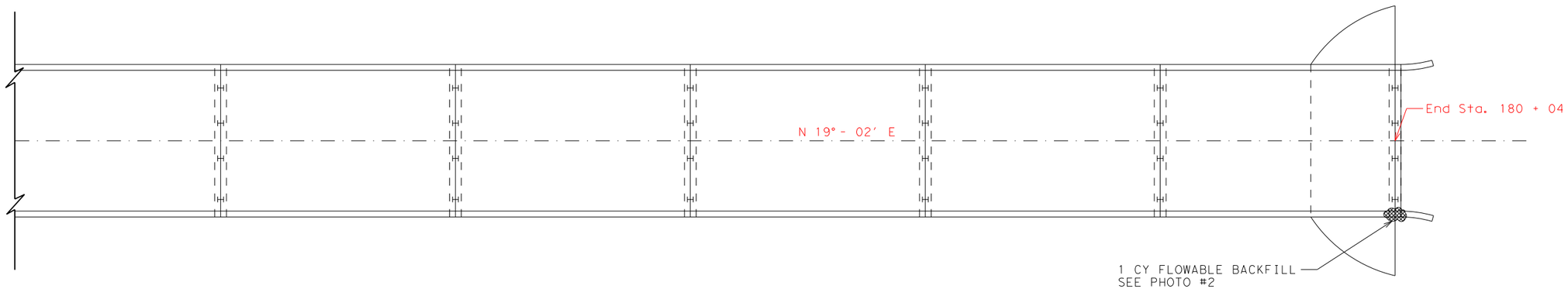

DN: | CK: | DW: | CK:

DATE: 8/31/2021 11:27:16 AM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1476 LEON RIVER.dgn

STATE OF TEXAS
JASON H. SCANTLING
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09/03/2021

FM 1476 @ LEON RIVER
230470103902014
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		77

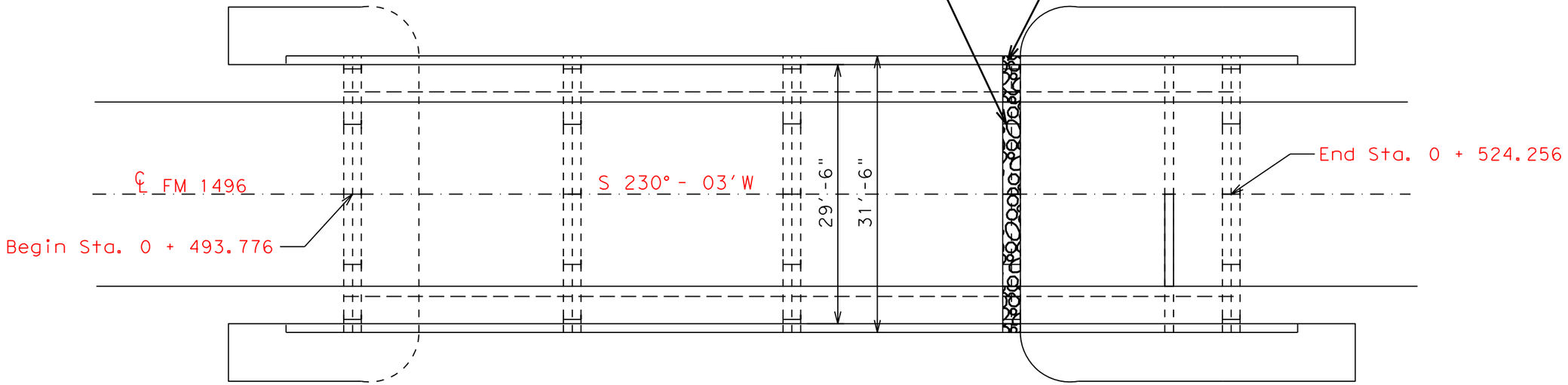
ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	25	CY
110	6002	EXCAVATION(CHANNEL)	1	CY
420	6158	CL C CONC(PILE ENCASEMENT)	5	LF

1 CY EXCAVATION (CHANNEL)

5 LF CL C CONC (PILE ENCASEMENT)
SEE PHOTO #1

NOTE: SEE PILE REPAIR DETAILS FOR REFERENCE

25 CY RIPRAP (STONE PROTECTION)(24 IN)
SEE PHOTO #1



RIP RAP TOE
EXPOSED AT SOUTH
ABUTMENT

Looking S

IMG. 077

Note: Toe of rip rap exposed at South abutment up to 2' feet.

PHOTO #1

Sta 0+493.776 - 0+524.256
4 Simple Reinforced Conc Slab Spans With Edge Beams
On Steel Pile Bents

STATE OF TEXAS
JASON H. SCANTLING
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LICENSED
PROFESSIONAL ENGINEER

08/19/2021

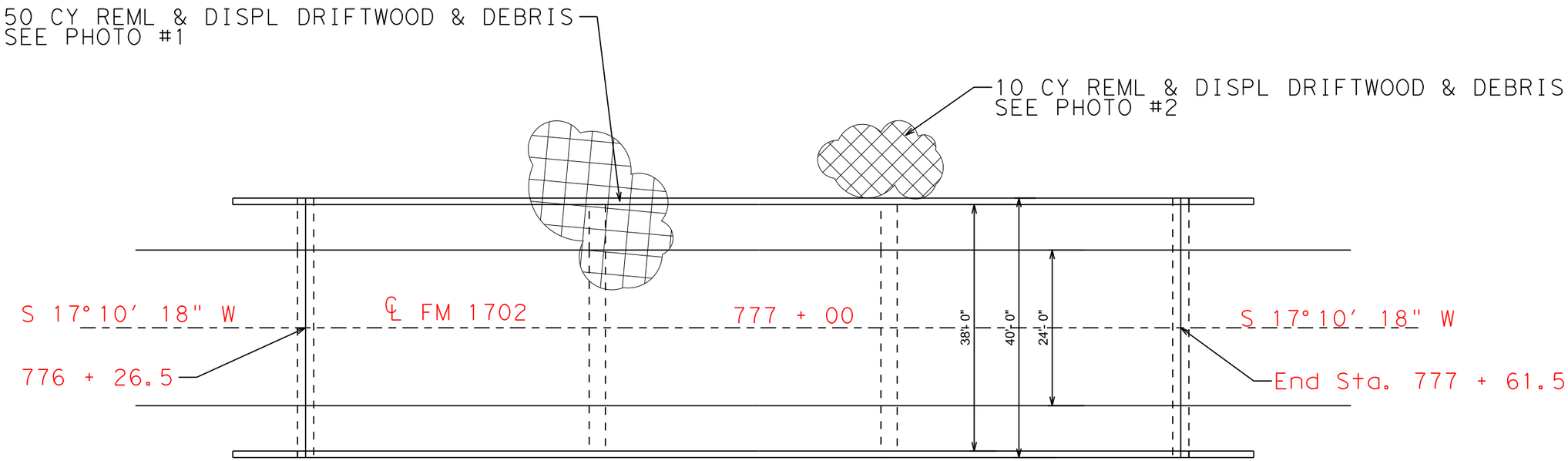
FM 1496 @
COW CREEK
230470103903002
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		78

DATE: 8/18/2021 4:32:48 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 1496 COW CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	60	CY



DATE: 20 AUG 2019
COUNTY: 047
CONT-SEC: 1039-01
STR: 016

DRIFT BUILDUP
BENT 2

Looking NE

IMG. 0653

Note: A moderate amount of drift upstream side bent 2.

PHOTO #1

DRIFT BUILDUP
BENT 3

Looking E

IMG. 0652

Note: A small amount of drift upstream side bent 3.

PHOTO #2

Sta. 776+26.5 - 777+61.5
3-span simple Prestressed Concrete Type C Beam
On Concrete Pile Bents

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

FM 1702 @
LEON RIVER
230470103901016
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		79

DATE: 8/18/2021 4:32:49 PM
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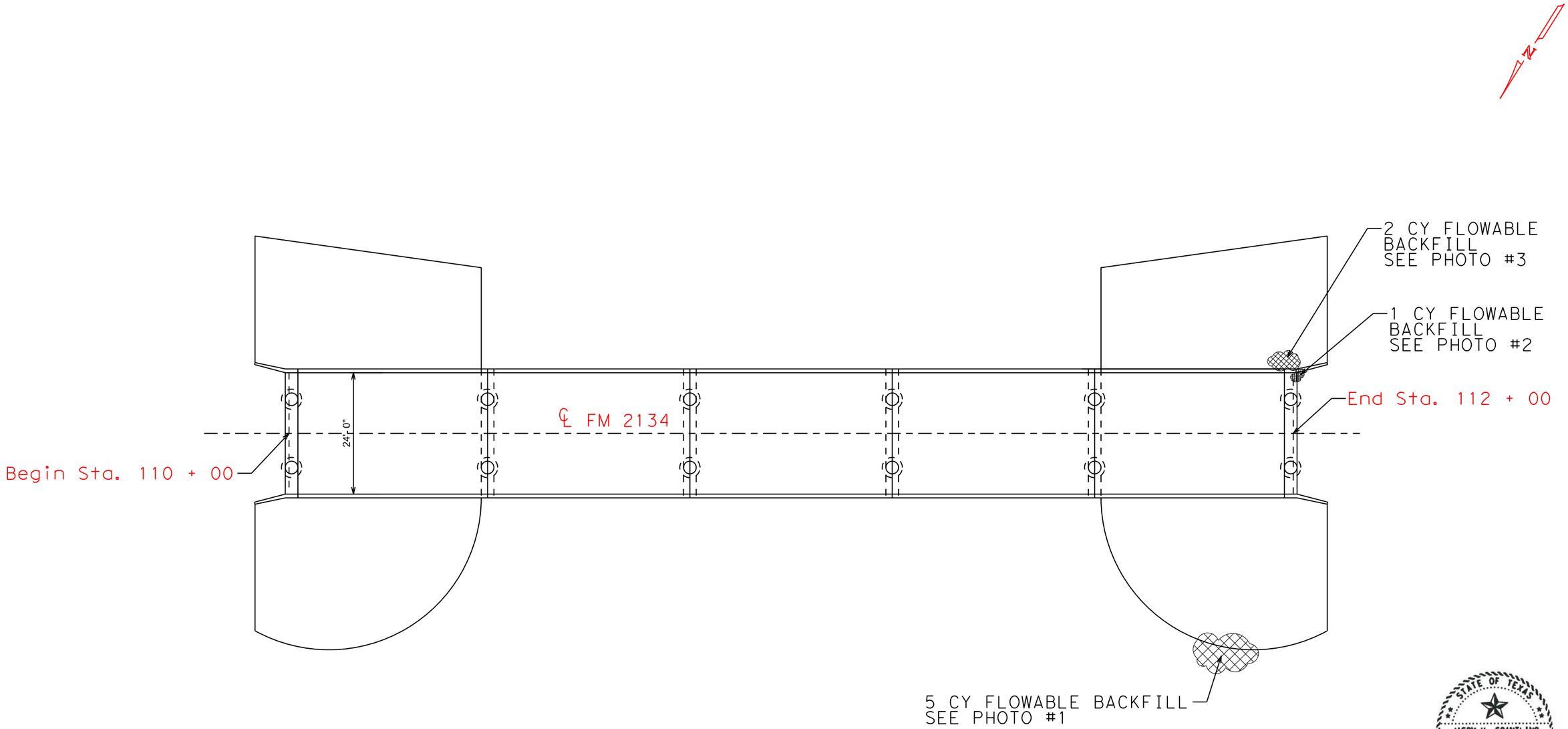

Sta. 110+00 - 112+00
5-span simple reinforced concrete pan girder bridge on concrete two column bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	8	CY

STATE OF TEXAS
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08/19/2021

FM 2134 @ ELM CREEK
230420200601007
COLEMAN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		80

DATE: 8/18/2021 4:32:51 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2134 ELM CREEK.dgn

EROSION
Looking N

IMG. 381

Note: Erosion and undermining at rip rap edge at NW corner.

PHOTO #1

DATE: 13 JULY 2019
COUNTY: 042
CONT-SEC: 2006-01
STR: 007

UNDERMINING
Looking E

IMG. 378

Note: Undermining of rip rap at SW corner.

PHOTO #2

VOID
Looking N

IMG. 379

Note: Void beneath of rip rap at SW corner.

PHOTO #3

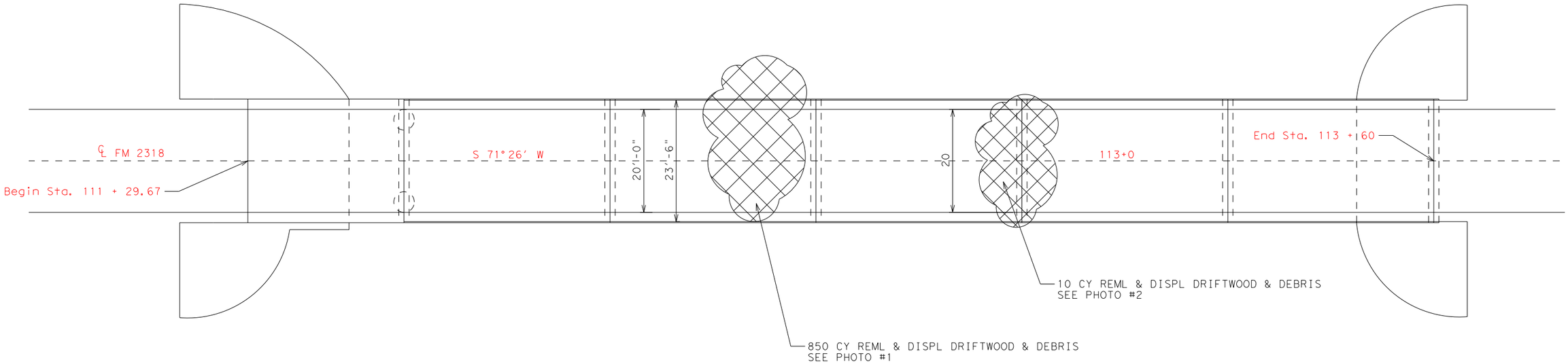
DATE: 8/18/2021 4:32:51 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2134 ELM CREEK.dgn

FM 2134 @
ELM CREEK
230420200601007
COLEMAN CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0923	00	064	FM 2134
DIST	COUNTY		SHEET NO.
23	COLEMAN		81

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	860	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	48	EA
427	6006	EPOXY WATERPROOF FINISH	240	SF



NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

DRIFT AT BENTS 3 AND 4
Looking W
IMG. 365

Note: Drift caught at bents 3 and 4.

PHOTO #1

DRIFT AT BENTS 4 AND 5
Looking E
IMG. 368

Note: Drift caught at bents 4 and 5.

PHOTO #2

Sta. 111+29.67 - 113+60
6 Simple Span Reinforced
Concrete Pan Girder Bridge
On Conc Two Column Bents

DATE: 16 AUG 2019
COUNTY: 047
CONT-SEC: 2703-01
STR: 001

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

09/03/2021

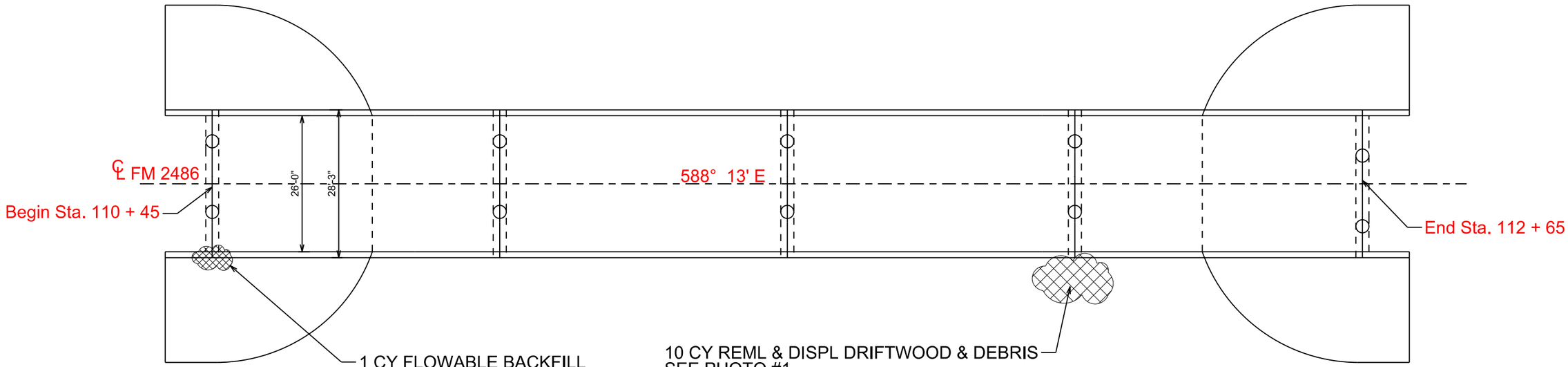
FM 2318 @
SABANNA RIVER
23047270301001
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		82

DATE: 8/31/2021 11:40:18 AM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2318 SABANNA RIVER.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD &DEBRIS	10	CY
401	6001	FLOWABLE BACKFILL	1	CY



Sta. 110+45 - 112+65
4-Span Simple Prestressed Concrete Girder
Bridge On Concrete Supports

DRIFT UPSTREAM
SIDE BENT 4

Looking E

IMG. 0756

Note: Drift at the upstream side of Bent 4 South column.

PHOTO #1

UNDERMINING SW
CORNER

Looking NE

IMG. 0761

Note Embankment erosion has undermined concrete riprap approx. 1.5' at SW corner.
Undermining extends approx. 3' under the riprap.

PHOTO #2

DATE: 21 AUG 2019
COUNTY: 047
CONT-SEC: 2391-01
STR: 007

STATE OF TEXAS
JASON H. SCANTLING
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08/19/2021

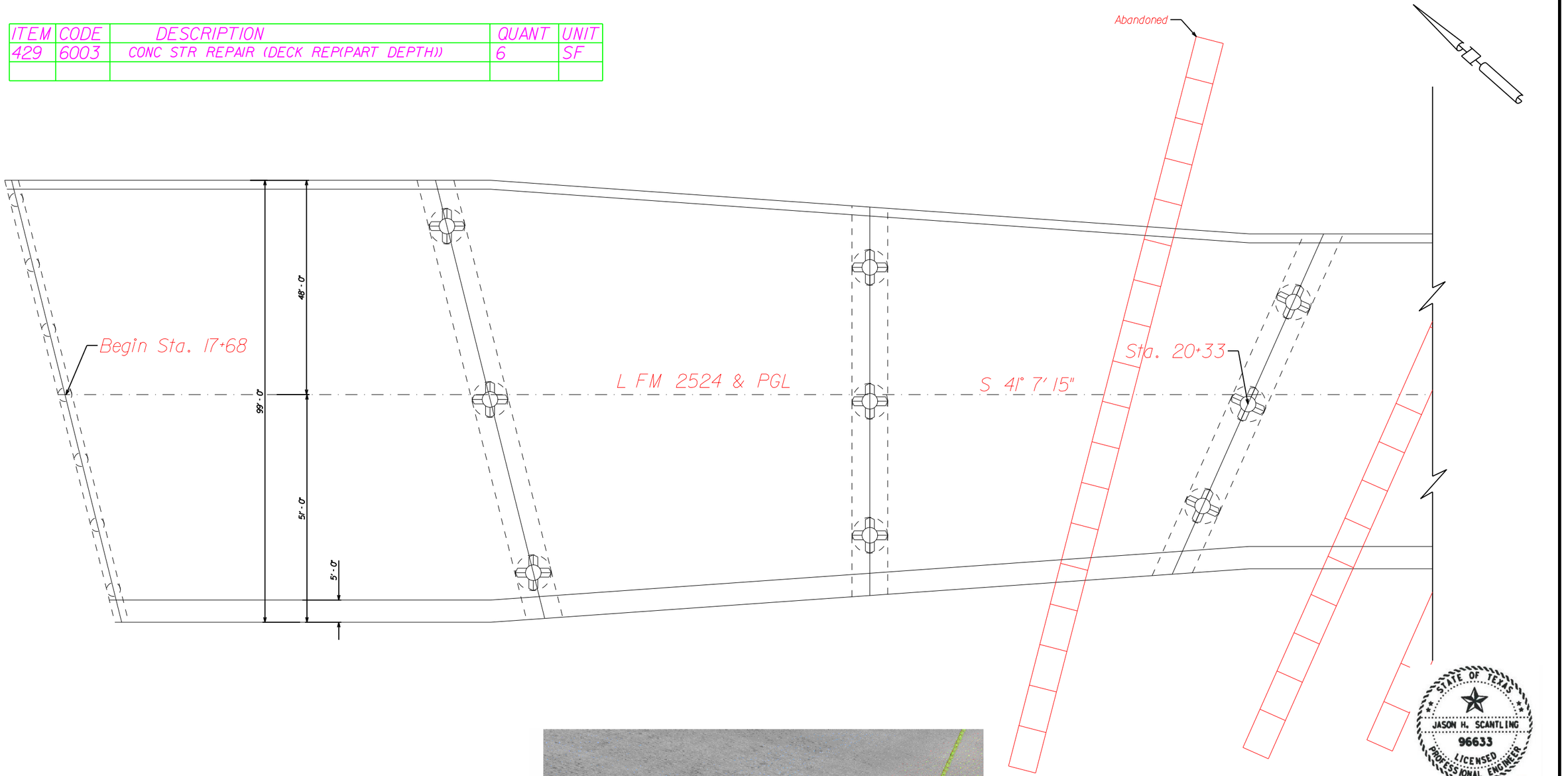
FM 2486 @
S LEON RIVER
230470239101007
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		83

DATE: 8/18/2021 4:32:54 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2486 S LEON RIVER.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6003	CONC STR REPAIR (DECK REP(PART DEPTH))	6	SF



SPAN 9 DECK - LOOKING SOUTHEAST VIEW 2076

NOTE: MODERATE SPALLS WITH UP TO 6 SQUARE FEET OF EXPOSED REBAR IN SOUTHBOUND LANE IN SPAN 9 FROM NORTHWEST.

PHOTO #1

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

Sta. 17+68 - 26+94.38
9 SIMPLE SPAN PRESTRESSED
CONCRETE I-BEAM BRIDGE
ON CONCRETE COLUMN BENTS

FM 2524 @
BNSF RR & CARNEGIE ST
23025023770I006
BROWN CO.

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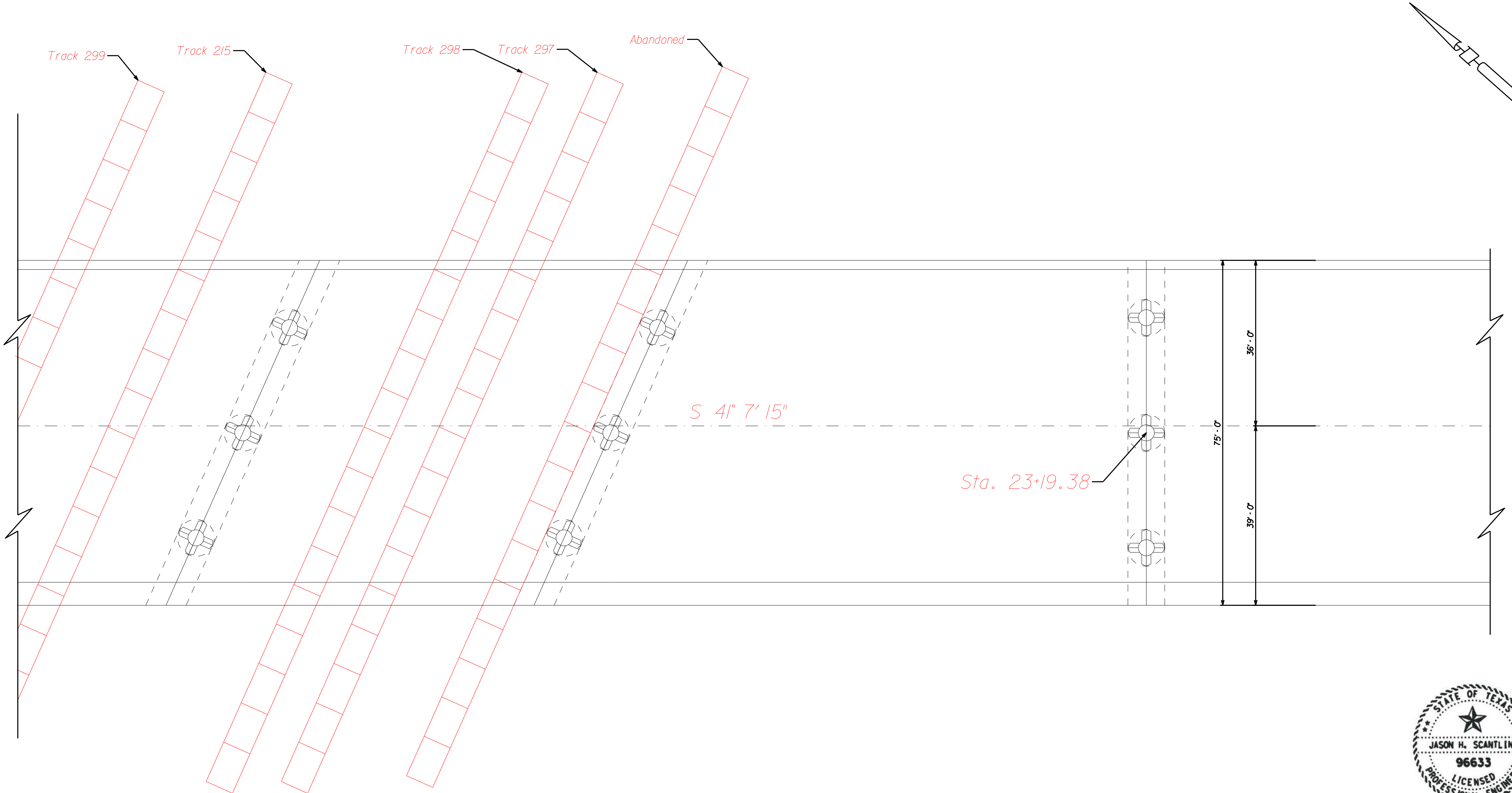
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		84

DATE: 8/19/2021 10:56:51 AM
FILE: ...\FM 2524 BNSF RR & CARNEGIE ST.dgn



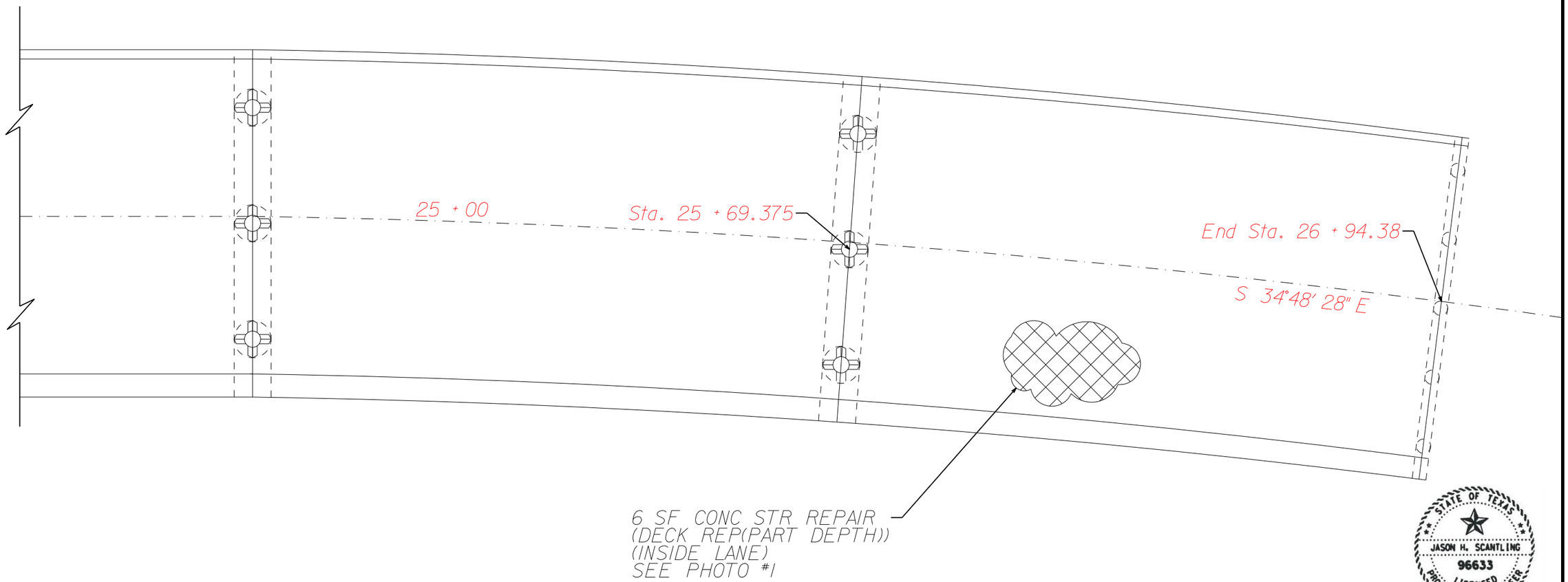
JASON H. SCANTLING
96633
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
08/19/2021

Sta. 17+68 - 26+94.38
9 SIMPLE SPAN PRESTRESSED CONCRETE I-BEAM BRIDGE
ON CONCRETE COLUMN BENTS

FM 2524 @
BNSF RR & CARNEGIE ST
230250237701006
BROWN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST		COUNTY	SHEET NO.
BWD		COMANCHE,ETC.	85

DATE: 8/19/2021 10:58:00 AM
FILE: ...\FM 2524 BNSF RR & CARNEGIE ST.dgn



STATE OF TEXAS
JASON H. SCANTLING
96633
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PROFESSIONAL ENGINEER

08/19/2021

FM 2524 @ BNSF RR & CARNEGIE ST
230250237701006
BROWN CO.

Sta. 17+68 - 26+94.38
9 SIMPLE SPAN PRESTRESSED CONCRETE I-BEAM BRIDGE
ON CONCRETE COLUMN BENTS

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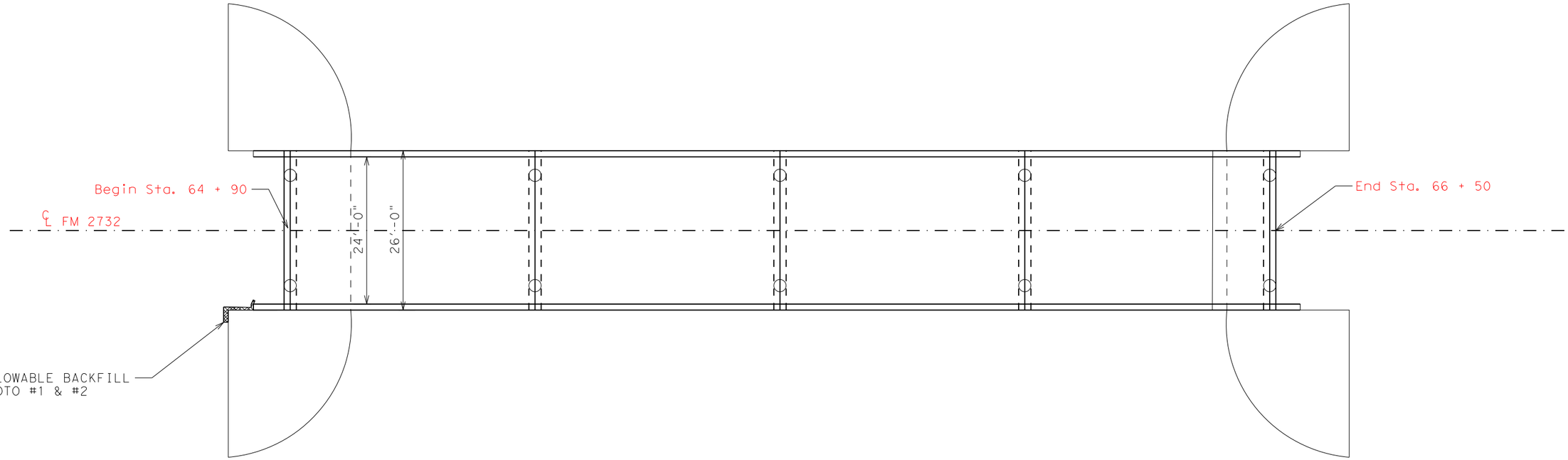
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		86

DATE: 8/19/2021 10:59:12 AM
FILE: ...\FM 2524 BNSF RR & CARNEGIE ST.dgn



Sta. 64+90 - 66+50
5-Span Simple Concrete Pan Girder Bridge

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	2	CY

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

FM 2732 @
WALLACE CREEK
23206272901001
SAN SABA CO.

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		87

DATE: 8/18/2021 4:33:10 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2732 WALLACE CREEK.dgn

DN: | CK: | DW: | CK:

PHOTO 1

NE EMBANKMENT
EROSION

Looking W

IMG. 266

Note: Embankment erosion at Northeast approach.

PHOTO 2

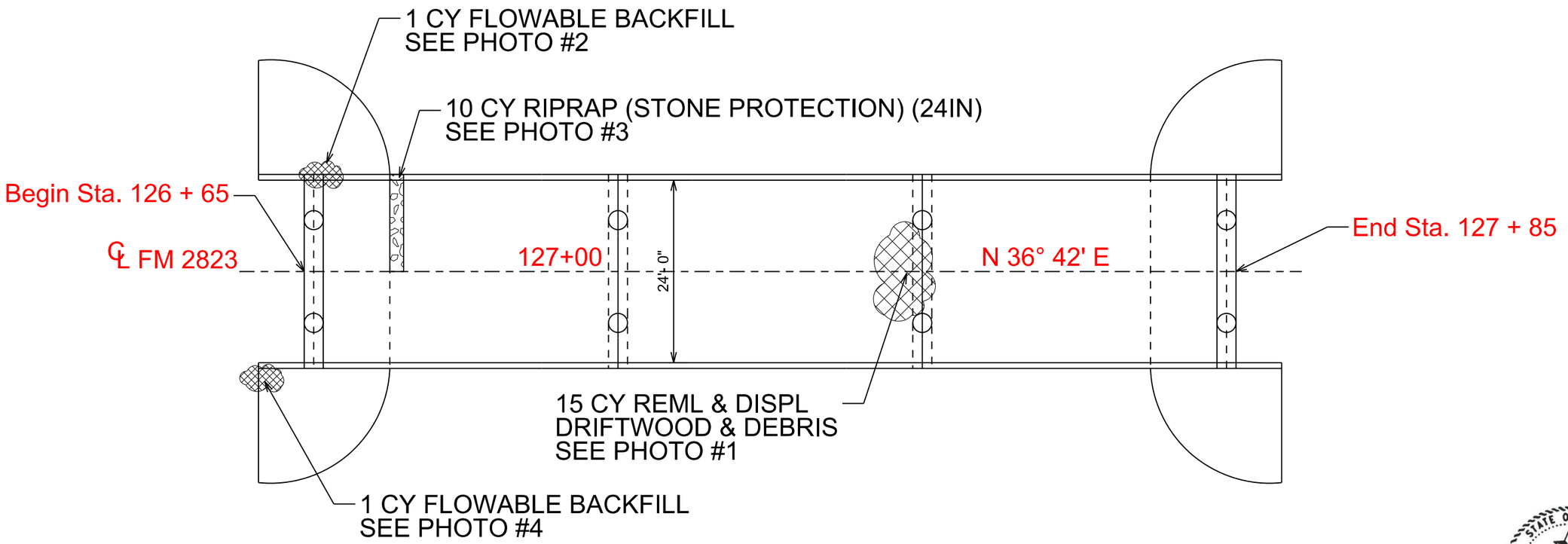
FM 2732 @
WALLACE CREEK
23206272901001
SAN SABA CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		88

DATE: 8/18/2021 4:33:11 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2732 WALLACE CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	10	CY
401	6001	FLOWABLE BACKFILL	2	CY
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	15	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	24	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF



NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 126+65 - 127+85
3-Span Simple Reinforced Concrete Pan Girder
Bridge On Concrete Two Column Bents

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

09/03/2021

FM 2823 @
RESLEY CREEK
230470165904001
COMANCHE CO.

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		89

DATE: 8/31/2021 11:47:52 AM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2823 RESLEY CREEK.dgn

DATE: 19 AUG 2019
COUNTY: 047
CONT-SEC: 1659-04
STR: 001

ROCK GABIONS
BENT 3

Looking SE

IMG. 0588

Note: Rock gabions have placed around drilled shafts at bent 3.

PHOTO #1

SETTLEMENT
RIPRAP SW
ABUTMENT

Looking SW

IMG. 0582

Note: Concrete riprap at SW abutment riprap has settled approximately 2".

PHOTO #2

EROSION SW
ABUTMENT W
CORNER

Looking SW

IMG. 0584

Note: Erosion due to roadway runoff has exposed concrete riprap toe approximately 1.5' at the SW abutment at West corner.

PHOTO #3

UNDERMINING S
CORNER

Looking NE

IMG. 0589

Note: Embankment erosion due to roadway runoff has undermined the top edge of the riprap approximately 6' at the South corner.

PHOTO #4

FM 2823 @
RESLEY CREEK
230470165904001
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		90

DATE: 8/18/2021 4:33:13 PM
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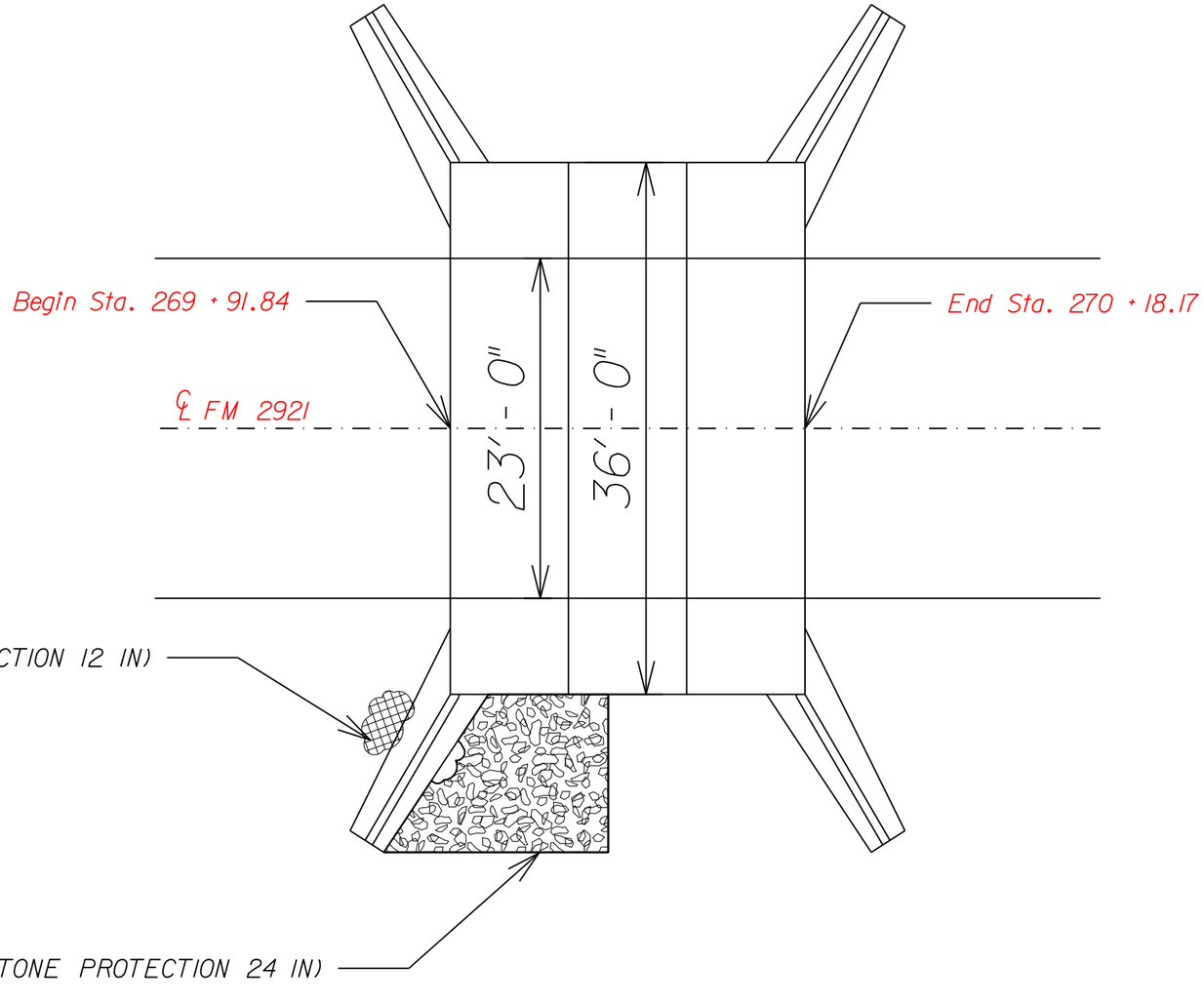

Sta. 269+91.84 - 270+18.17
3 - 8' x 6' x 37.3' REINFORCED CONCRETE
BOX CULVERT WITH CAST IN PLACE CONCRETE
Wingwalls

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIP RAP (STONE PROTECTION 24 IN)	14	CY
432	6031	RIP RAP (STONE PROTECTION 12 IN)	7	CY

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08/19/2021

FM 2921 @
LEON RIVER TRIBUTARY
230470306602003
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		91

DATE: 8/18/2021 4:33:18 PM
FILE: ...\FM 2921 LEON RIVER TRIBUTARY.dgn

PHOTO #1

PHOTO #2

Note; Undermining of asphalt rip rap at SE corner.

PHOTO #3

DATE: 08 JULY 2019
COUNTY: 047
CONT-SEC: 3066-02
STR: 003

UNDERMINING

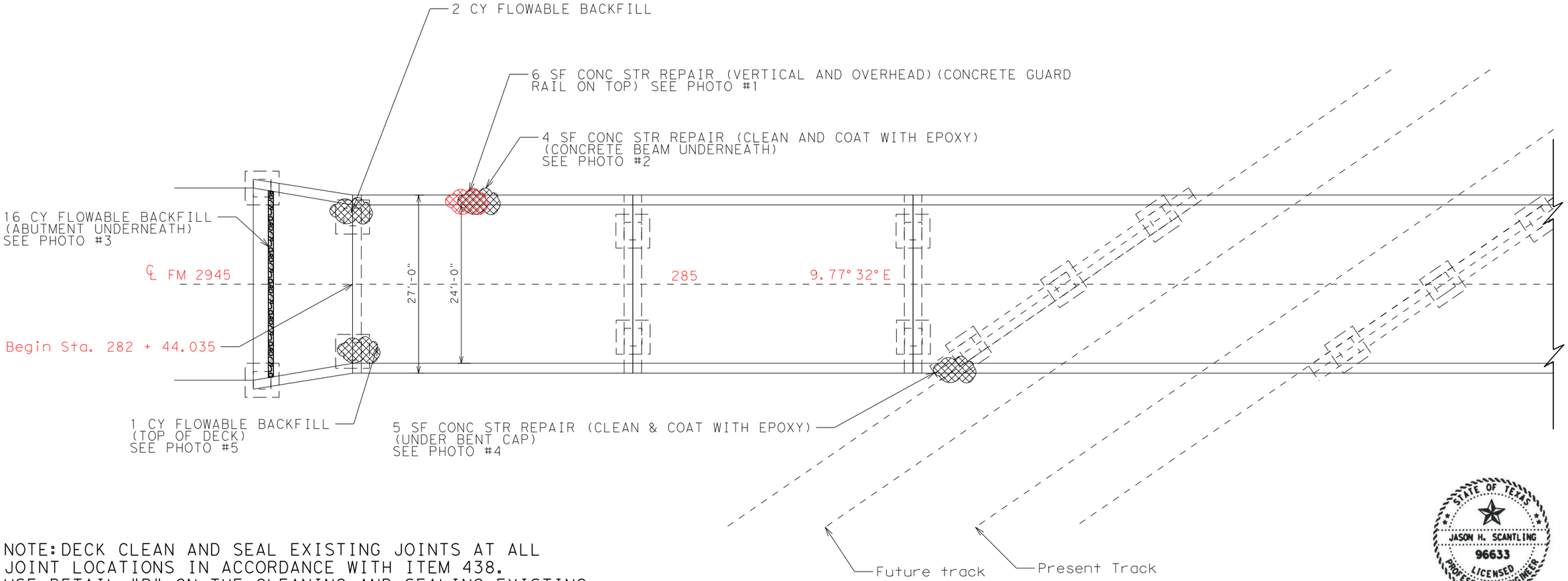
Looking N

IMG. 063

DATE: 8/18/2021 4:33:18 PM
FILE: ...\FM 2921 LEON RIVER TRIBUTARY.dgn

FM 2921 @
LEON RIVER TRIBUTARY
230470306602003
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		92



NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

NOTE: A UNITED STATES ARMY CORP OF ENGINEERS PERMIT WAS NOT OBTAINED FOR THE FOLLOWING LOCATION, WORK WITHIN THE ORDINARY HIGH WATER MARK OF THE FOLLOWING CREEK SHALL NOT OCCUR- 230680000714013 (FM 2945 OVER SANDY CREEK)

Sta. 282+44.035 - 286+08.305
8 Simple Concrete Beam Spans
& 1 Simple Steel Stringer Main Span
On Concrete Supports (Variable Skew)
UP DOT RR #839 272J

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WITH EPOXY)	12	SF
401	6001	FLOWABLE BACKFILL	19	CY
429	6010	CONC STR REPAIR(VERTICAL & OVERHEAD)	16	SF
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	324	LF

STATE OF TEXAS
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J.H. Scantling, P.E.

09/03/2021

FM 2945 @ SANDY CREEK & UP RR
230680000714013
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		93

DATE: 8/31/2021 2:48:07 PM
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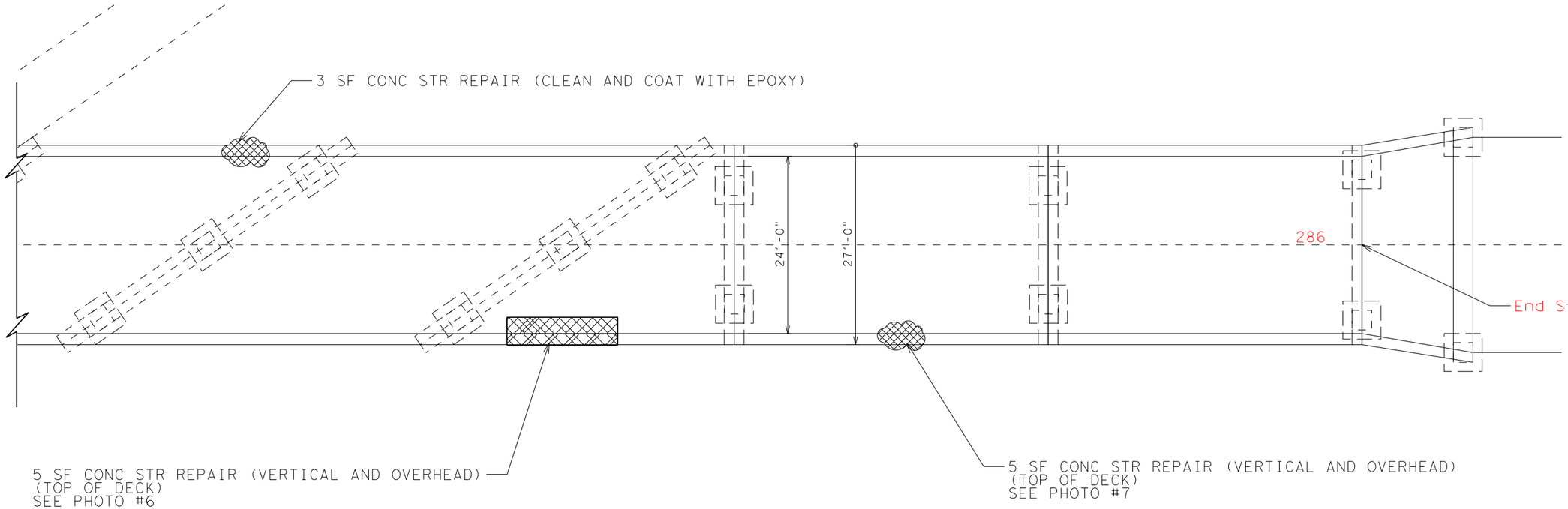

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08/19/2021

FM 2945 @
SANDY CREEK & UP RR
230680000714013
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		94

DATE: 8/18/2021 4:33:22 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2945 SANDY CREEK & UP RR.dgn

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NORTH RAIL AT SPAN 1 - LOOKING NORTH VIEW 367

NOTE: IMPACT DAMAGE ON NORTH RAIL AT SPAN 1 CAUSED 3' x 2' SPALL WITH EXPOSED REBAR.

PHOTO #1

SPALL ON SPAN 1 EXTERIOR BEAM - LOOKING EAST VIEW 390

NOTE: SEVERE SPALL WITH EXPOSED CORRODED REBAR NEAR MIDSPAN ON EXTERIOR BEAM OF SPAN 1.

PHOTO #2

ABUTMENT 1 WALL UNDERMINING - LOOKING WEST VIEW 389

NOTE: EROSION CAUSED 20" UNDERMINING ALONG THE FULL LENGTH OF ABUT. 1 WALL.

PHOTO #3

BENT 4 CAP - LOOKING NORTHWEST VIEW 396

NOTE: BENT 4 CAP AT SOUTH END HAS A MODERATE TO SEVERE SPALL WITH EXPOSED REBAR.

PHOTO #4

SW APPROACH CORNER - LOOKING EAST VIEW 366

NOTE: THERE IS A 2' x 8" x 11" DEEP POTHOLE AT SW APPROACH CORNER NEXT TO BRIDGE END.

PHOTO #5

PHOTO #6

PHOTO #7

FM 2945 @
SANDY CREEK & UP RR
230680000714013
EASTLAND CO.

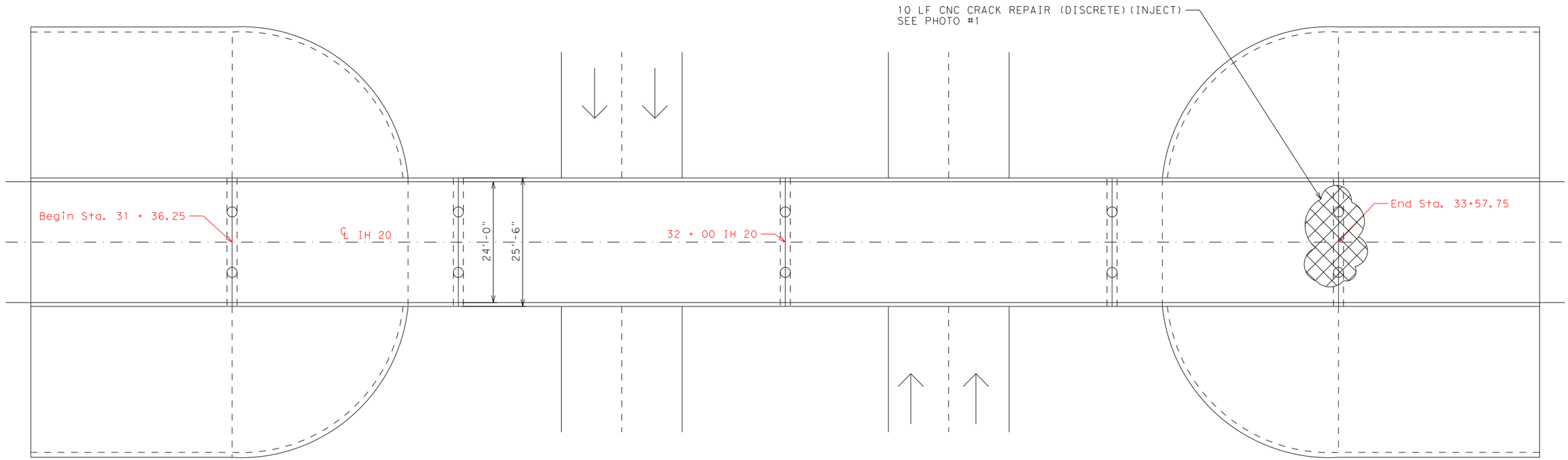
Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		95

DATE: 8/18/2021 4:33:23 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\FM 2945 SANDY CREEK & UP RR.dgn

DN: CK: DW: CK:

ITEM	CODE	DESCRIPTION	QUANT	UNIT
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	10	LF



Sta. 31+36.25 - 33+57.75
4 Simple Span Prestressed Concrete Girder
On concrete Supports

SOUTH ABUTMENT CAP - LOOKING SOUTH VIEW 120

NOTE: HORIZONTAL CRACKING UP TO 1/4" WIDE IN THE SOUTH ABUTMENT CAP.

PHOTO #1

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08/19/2021

IH 20 @
CR 136
230680000703081
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		96

DATE: 8/18/2021 4:33:25 PM
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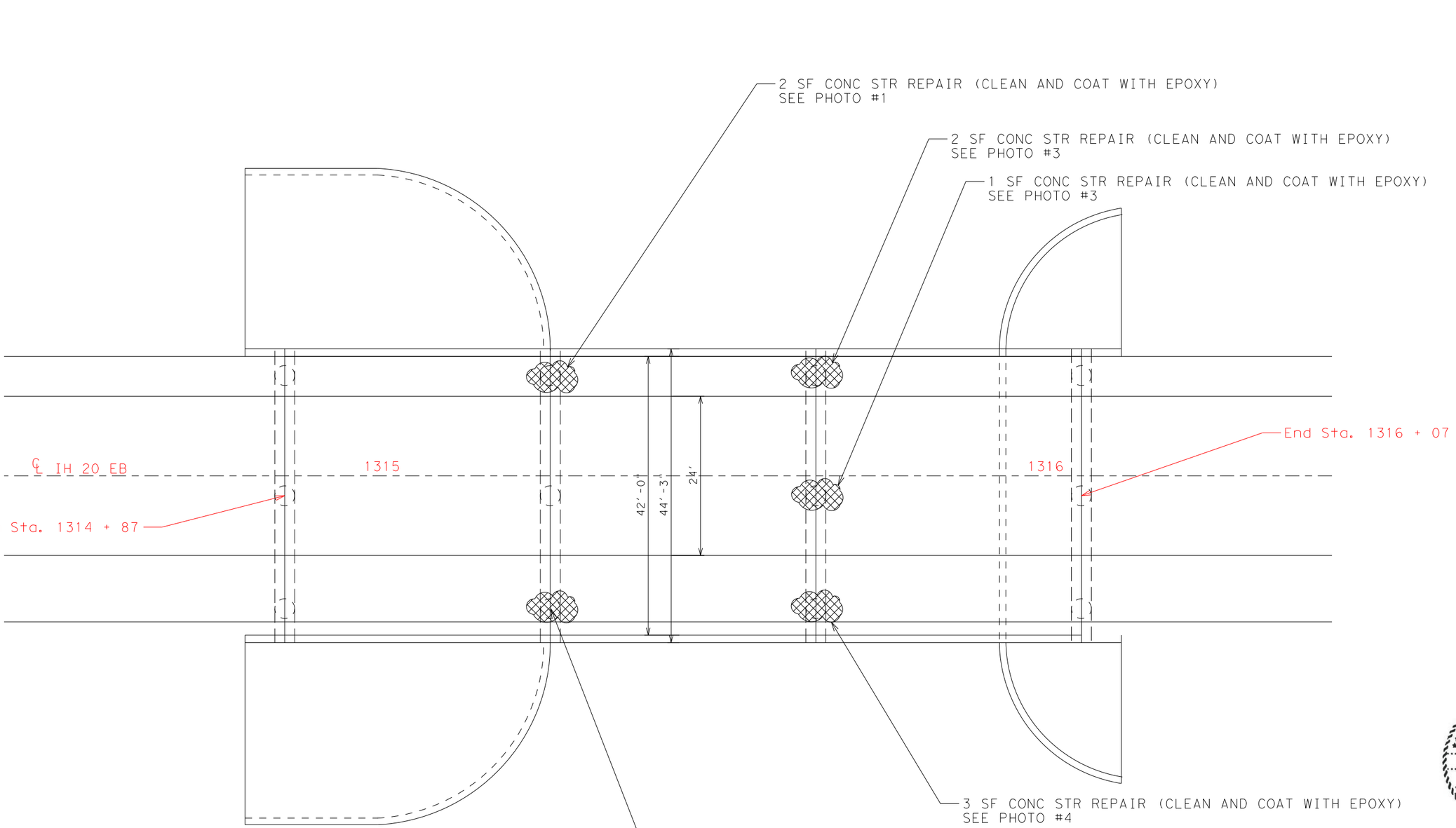

NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 1314+87 - 1316+07
3 Simple Span Reinforced Concrete Pan Girder
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	176	LF
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	10	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	42	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF

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IH 20 EB @
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230680000704167
EASTLAND CO.

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		97

DATE: 8/31/2021 1:43:21 PM
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NORTH EXTERIOR COLUMN - LOOKING WEST VIEW 5790

NOTE: MODERATE SPALLS WITH EXPOSED REBAR IN SURFACE OF NORTH EXTERIOR COLUMN AT SOUTHWEST INTERIOR BENT.

PHOTO #1

SOUTH EXTERIOR COLUMN - LOOKING SOUTHWEST VIEW 5791

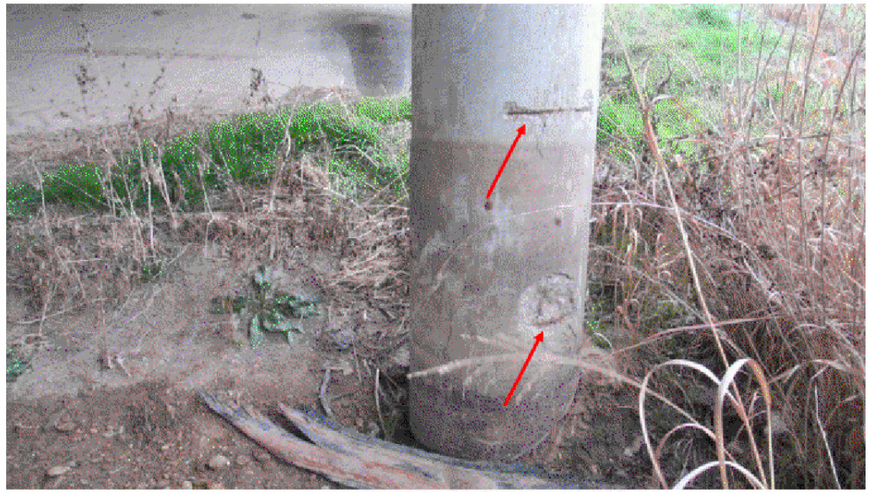
NOTE: MINOR DIAGONAL CRACK AND DELAMINATION IN SURFACE OF SOUTH EXTERIOR COLUMN AT SOUTHWEST INTERIOR BENT.

PHOTO #2

COLUMNS - LOOKING NORTHEAST VIEW 5782

NOTE: MODERATE SPALLS WITH EXPOSED REBAR IN SURFACE OF NORTH AND CENTER COLUMNS AT NORTHEAST INTERIOR BENT.

PHOTO #3



SOUTH EXTERIOR COLUMN - LOOKING SOUTHEAST VIEW 5783

NOTE: MODERATE SPALLS WITH EXPOSED REBAR IN SURFACE OF SOUTH EXTERIOR COLUMN AT NORTHEAST INTERIOR BENT.

PHOTO #4

IH 20 EB @
COLONY CREEK
230680000704167
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		98

DATE: 8/18/2021 4:33:26 PM
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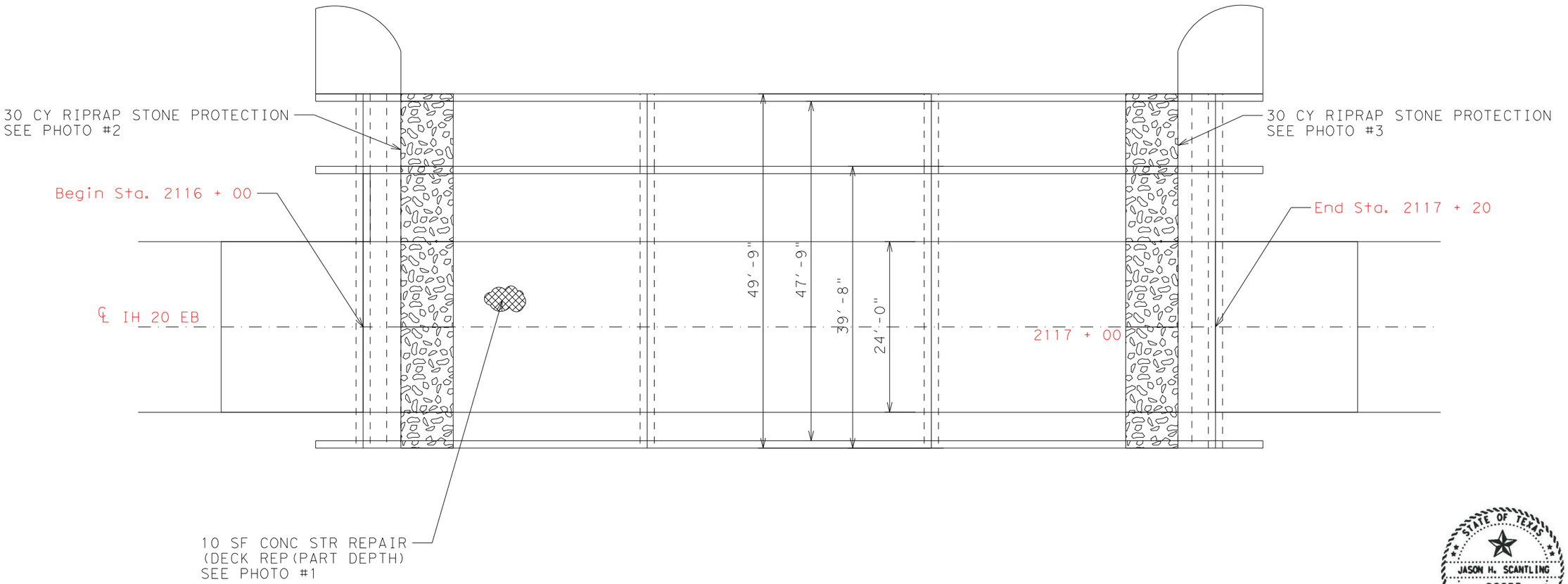

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta 2116+00 - 2117+20
3 Simple Span Reinforced Concrete Pan Girder Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	60	CY
429	6003	CONC STR REPAIR (DECK REP(PART DEPTH))	10	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	32	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF

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09/03/2021

IH 20 EB @ MIDDLE CREEK
230680031405035
EASTLAND CO.

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD			99

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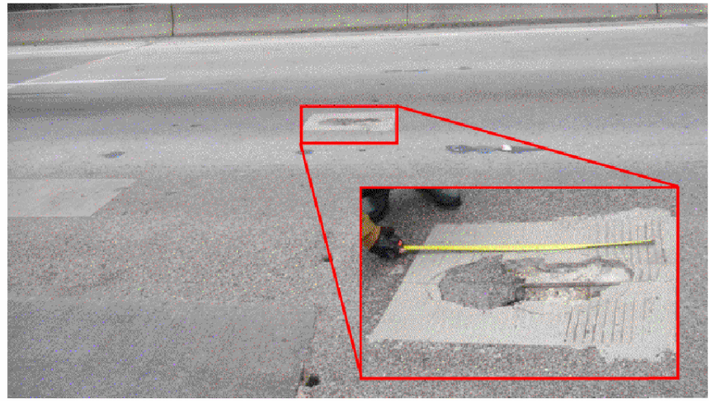


BRIDGE DECK - LOOKING SOUTH VIEW 6148

NOTE: BRIDGE DECK HAS A MODERATE SPALL WITH EXPOSED REBAR IN DECK SURFACE OF WEST SPAN. (DETAIL PHOTO VIEW 6173)

PHOTO #1

WEST ABUTMENT - LOOKING NORTHWEST VIEW 6158

NOTE: MODERATE EROSION OF WEST CHANNEL BANK UNDER BRIDGE.

PHOTO #2

EAST ABUTMENT - LOOKING NORTHEAST VIEW 6150

NOTE: MODERATE EROSION UP TO 14" DEEP ALONG EAST RIPRAP TOEWALL.

PHOTO #3

DN: CK: DW: CK:

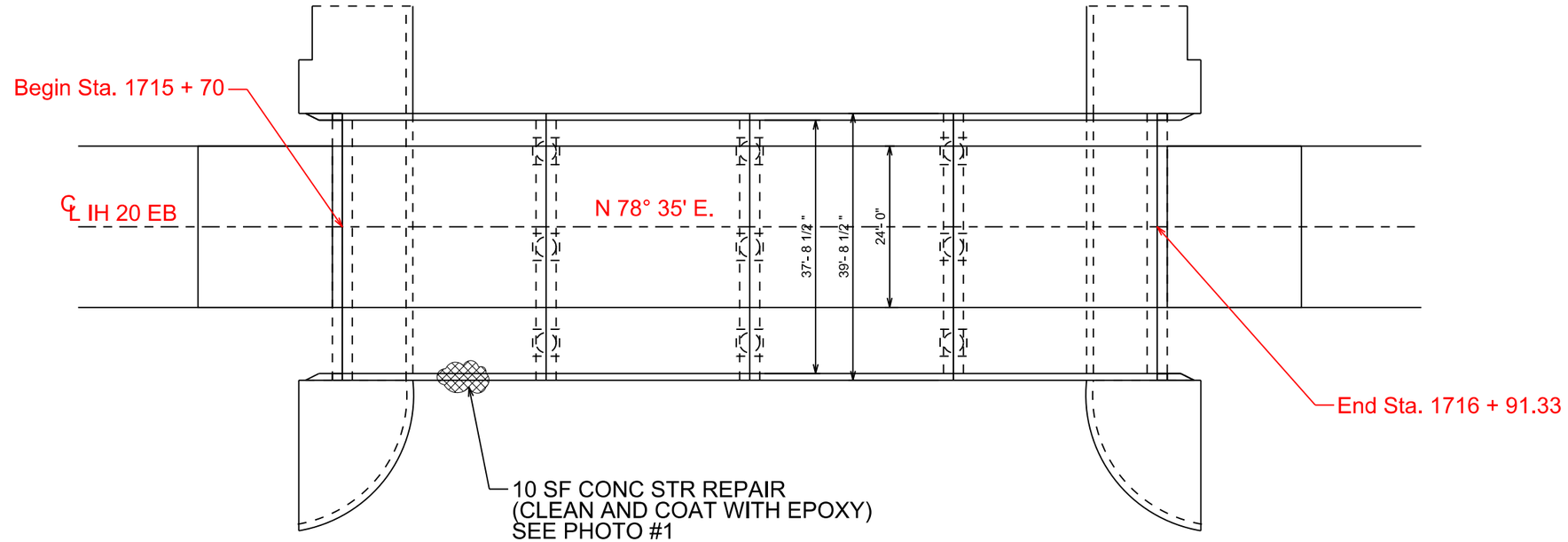
DATE: 8/18/2021 4:33:29 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 EB MIDDLE CREEK.dgn

IH 20 EB @
MIDDLE CREEK
230680031405035
EASTLAND CO.

Texas Department of Transportation®

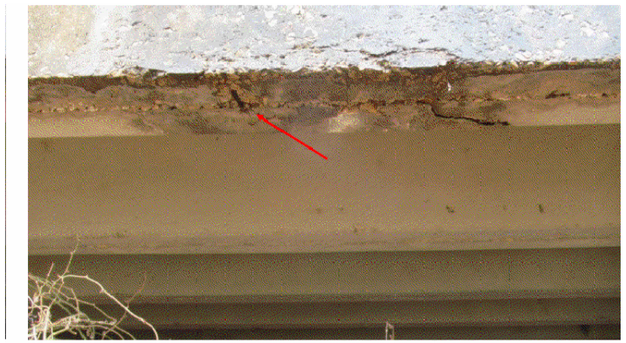
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		100

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	200	LF
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	10	SF



NOTE: CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE TO ITEM 438.

Sta. 1715+70 - 1716 + 91.33
4-span simple reinforced concrete pan girder
on concrete column bents



SOUTH EXTERIOR PAN GIRDER STEM - LOOKING NORTHWEST VIEW 6016

NOTE: SOUTH EXTERIOR PAN GIRDER STEM OF WEST SPAN HAS MINOR CRACKS AND MODERATE SCALING WITH EXPOSED REBAR NEAR WEST END.

PHOTO #1

STATE OF TEXAS
JASON H. SCANTLING
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08/19/2021

IH 20 EB @
RUSSELL CREEK
230680000706073
EASTLAND CO.

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CONT	SECT	JOB	HIGHWAY
0923	00	064	IH 20 EB
DIST	COUNTY		SHEET NO.
23	EASTLAND		101

DATE: 8/18/2021 4:33:30 PM
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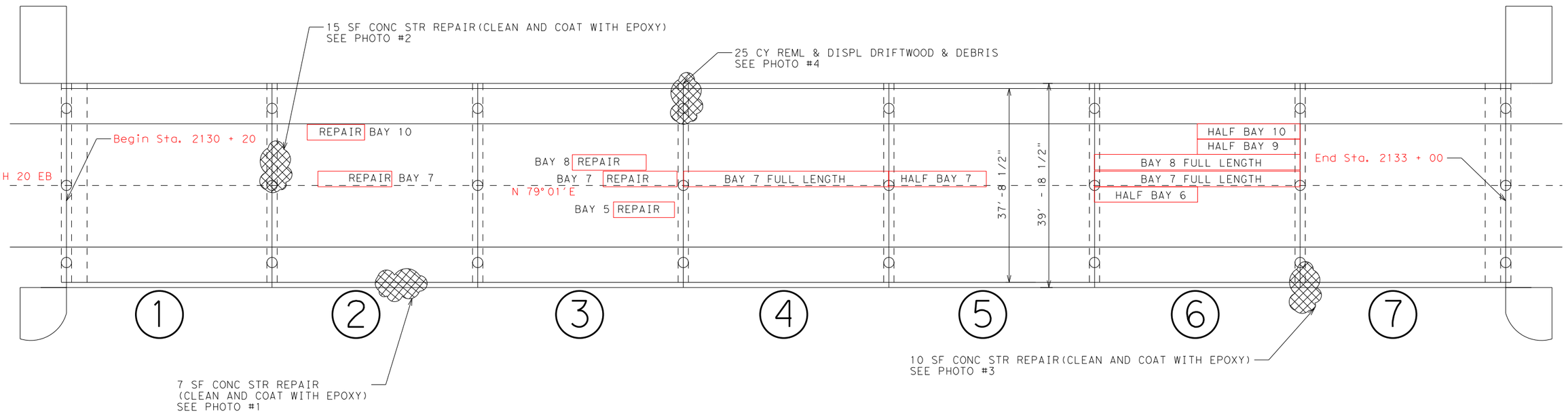

NOTE: REPAIR PAN GIRDER HOLES USING REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

NOTE: CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE TO ITEM 438.

NOTE: CONCRETE STRUCTURE DECK REPAIR(FULL DEPTH) SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 429 WITH UP TO 1000 SF (SEE PHOTO # 5-9). SEE CONCRETE SLAB AND GIRDER SPANS REPAIR DETAILS FOR REFERENCE. LOCATIONS TO BE FIELD VERIFIED BY THE CONTRACTOR. LOCATIONS OF REPAIR MUST BE APPROVED BY THE ENGINEER PRIOR TO BEGINING WORK. LOCATIONS MAY BE ADJUSTED BY THE ENGINEER.

Sta. 2130+20 - 2133+00
7 Simple Span Reinforced Concrete Pan Girder Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6001	CLEANING AND SEALING EXISTING JOINTS	320	LF
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	32	SF
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	25	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	91	EA
429	6005	CONC STR REPAIR(DECK REPR(FULL DPT))	1000	SF
427	6006	EPOXY WATERPROOF FINISH	280	SF

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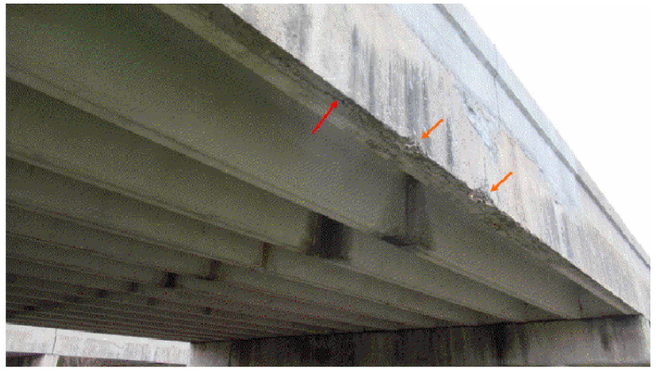
09/03/2021

IH 20 EB @
S FORK PALO
PINTO CREEK
230680031405037
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		102

DATE: 9/2/2021 4:22:34 PM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 EB S FORK PALO PINTO CREEK.dgn



EXTERIOR PAN GIRDER - LOOKING NORTHEAST VIEW 6187

NOTE: MODERATE LONGITUDINAL CRACK AND SPALLS IN BOTTOM OF SOUTH EXTERIOR GIRDER STEM OF SPAN 2.

PHOTO #1

BENT CAP 2 - LOOKING WEST VIEW 6188

NOTE: MODERATE SPALLS WITH EXPOSED REBAR IN EAST FACE OF BENT CAP 2 ABOVE CENTER COLUMN.

PHOTO #2

BENT CAP 7 - LOOKING NORTHWEST VIEW 6197

NOTE: MODERATE SPALL WITH EXPOSED REBAR AT SOUTH END OF BENT CAP 7 FROM WEST.

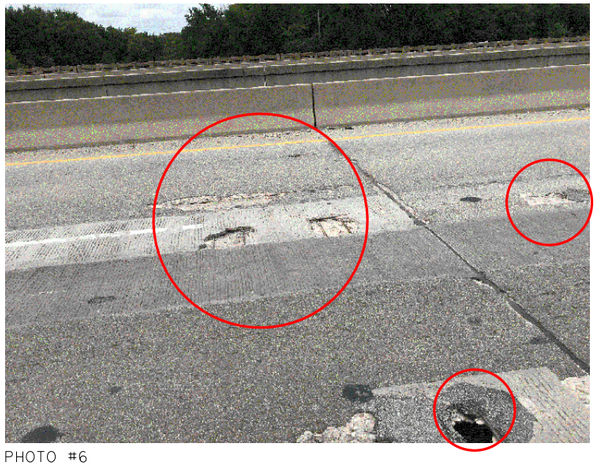
PHOTO #3

CHANNEL BED - LOOKING SOUTHEAST VIEW 6190

NOTE: ADVANCED DRIFT HAS ACCUMULATED ON INTERIOR BENT 4 FROM WEST.

PHOTO #4

PHOTO #5



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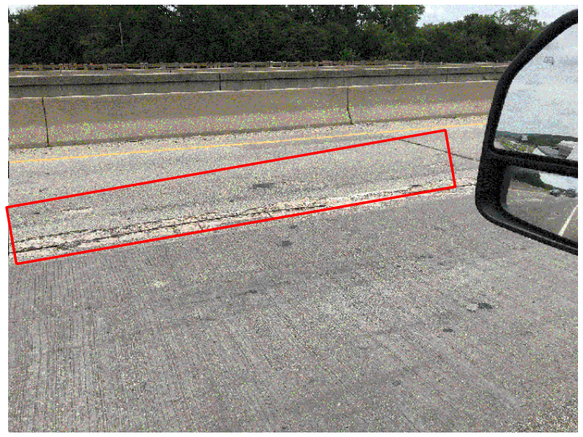


PHOTO #7

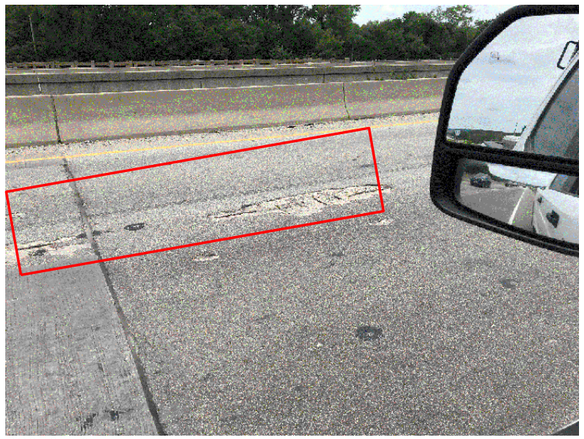


PHOTO #8

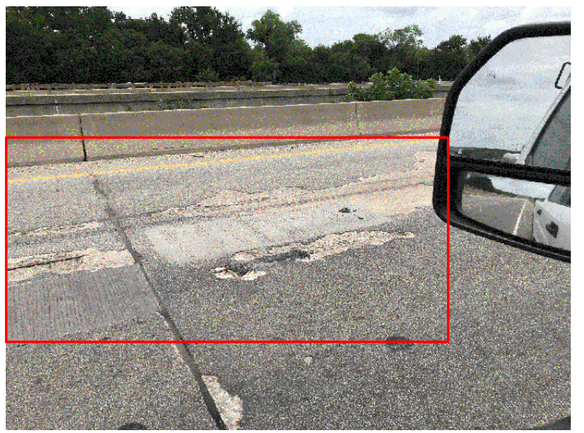


PHOTO #9

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

09/03/2021

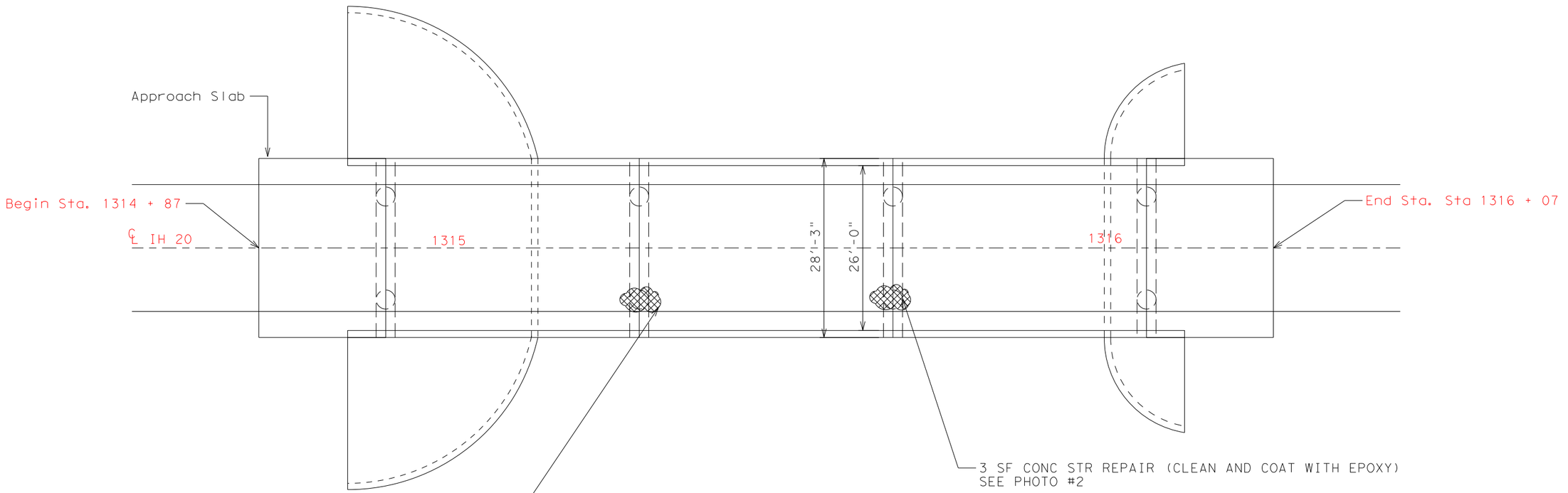
IH 20 EB @
S FORK PALO
PINTO CREEK
230680031405037
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		103

DATE: 9/2/2021 4:23:53 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 EB S FORK PALO PINTO CREEK.dgn

DN: CK: DW: CK:

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WITH EPOXY)	8	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	24	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF



NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 1314+87 - 1316+07
3 Simple Span Reinforced
Concrete Pan Girder Bridge
On Two Concrete Column Bents

SOUTHWEST INTERIOR BENT - LOOKING SOUTHWEST VIEW 5776

NOTE: MODERATE SPALL WITH EXPOSED REBAR IN SOUTHEAST COLUMN OF SOUTHWEST INTERIOR BENT.

PHOTO #1

NORTHEAST INTERIOR BENT - LOOKING SOUTHEAST VIEW 5774

NOTE: MODERATE SPALL WITH EXPOSED REBAR IN SOUTHEAST COLUMN OF NORTHEAST INTERIOR BENT.

PHOTO #2

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PROFESSIONAL ENGINEER

09/03/2021

IH 20 S FRONTAGE ROAD @
COLONY CREEK
230680000704168
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		104

DATE: 8/31/2021 1:31:05 PM
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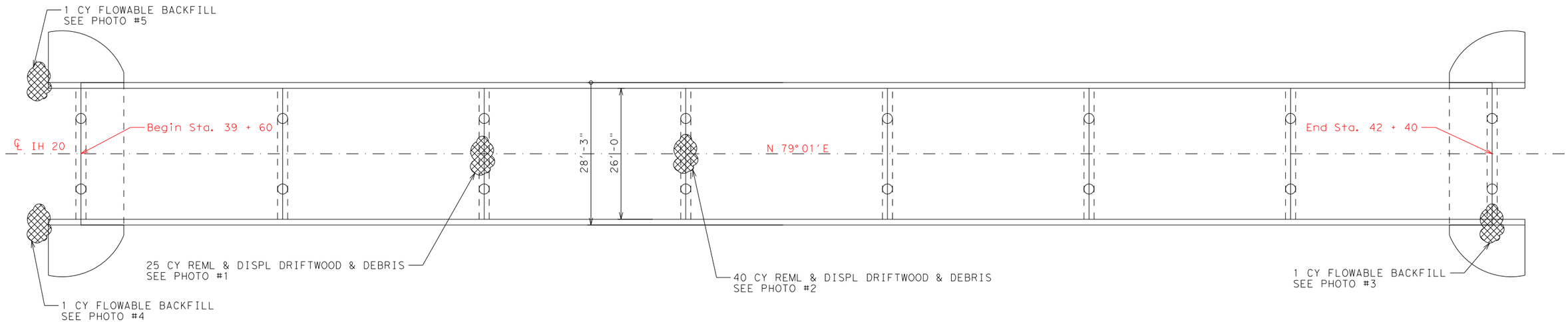

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 39+60 - 42+40
7 Simple Span Reinforced Concrete Pan Girder Bridge
On Two Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
7000	6001	REML & DISPL DRIFTWOOD & DEBRIS	65	CY
401	6001	FLOWABLE BACKFILL	3	CY
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	56	EA
427	6006	EPOXY WATERPROOF FINISH	280	SF

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

09/03/2021

IH 20 S FRONTAGE ROAD @
SOUTH FORK PALO PINTO CREEK
230680031405157
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		105

DATE: 8/31/2021 1:23:49 PM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 S FRONTAGE ROAD SOUTH FORK PALO PINTO CREEK.dgn
DGN:
DW:
CK:

DRILLED SHAFTS - LOOKING SOUTHWEST VIEW 6184

NOTE: SEVERE DRIFT HAS ACCUMULATED ON BENT 3. RETROFIT TIE BEAM HAS BEEN INSTALLED TO BRACE EXPOSED DRILLED SHAFT ROCKS ARE PLACED AROUND DRILLED SHAFTS AS WELL. DRILLED SHAFTS ARE EXPOSED 32" TALL OVER RETROFIT TIE BEAM.

PHOTO #1

CHANNEL BED - LOOKING SOUTHEAST VIEW 6185

NOTE: SEVERE DRIFT HAS ACCUMULATED ON INTERIOR BENT 4.

PHOTO #2

SOUTHEAST EMBANKMENT - LOOKING NORTH WEST VIEW 6176

NOTE: MODERATE RUNOFF EROSION AT SOUTHEAST CORNER OF BRIDGE UP TO 19" DEEP, 48" BACK UNDER EAST APPROACH SLAB AND 31" ALONG AND UNDER SOUTHEAST WINGWALL.

PHOTO #3

SOUTHWEST EMBANKMENT - LOOKING NORTH VIEW 6182

NOTE: EROSION IS 20" DEEP AND 20" BACK UNDER WEST APPROACH SLAB. SOUTHWEST GUARDFENCE TIMBER POSTS ARE DECAYED.

PHOTO #4

NORTHWEST EMBANKMENT - LOOKING SOUTHEAST VIEW 6180

NOTE: EROSION IS UP TO 20" DEEP AND 24" BACK UNDER WEST APPROACH SLAB AT NORTHWEST CORNER OF BRIDGE. NORTHWEST GUARDFENCE TIMBER POSTS ARE DECAYED.

PHOTO #5

IH 20 S FRONTAGE ROAD @
SOUTH FORK PALO PINTO CREEK
230680031405157
EASTLAND CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		106

DATE: 8/18/2021 4:33:40 PM
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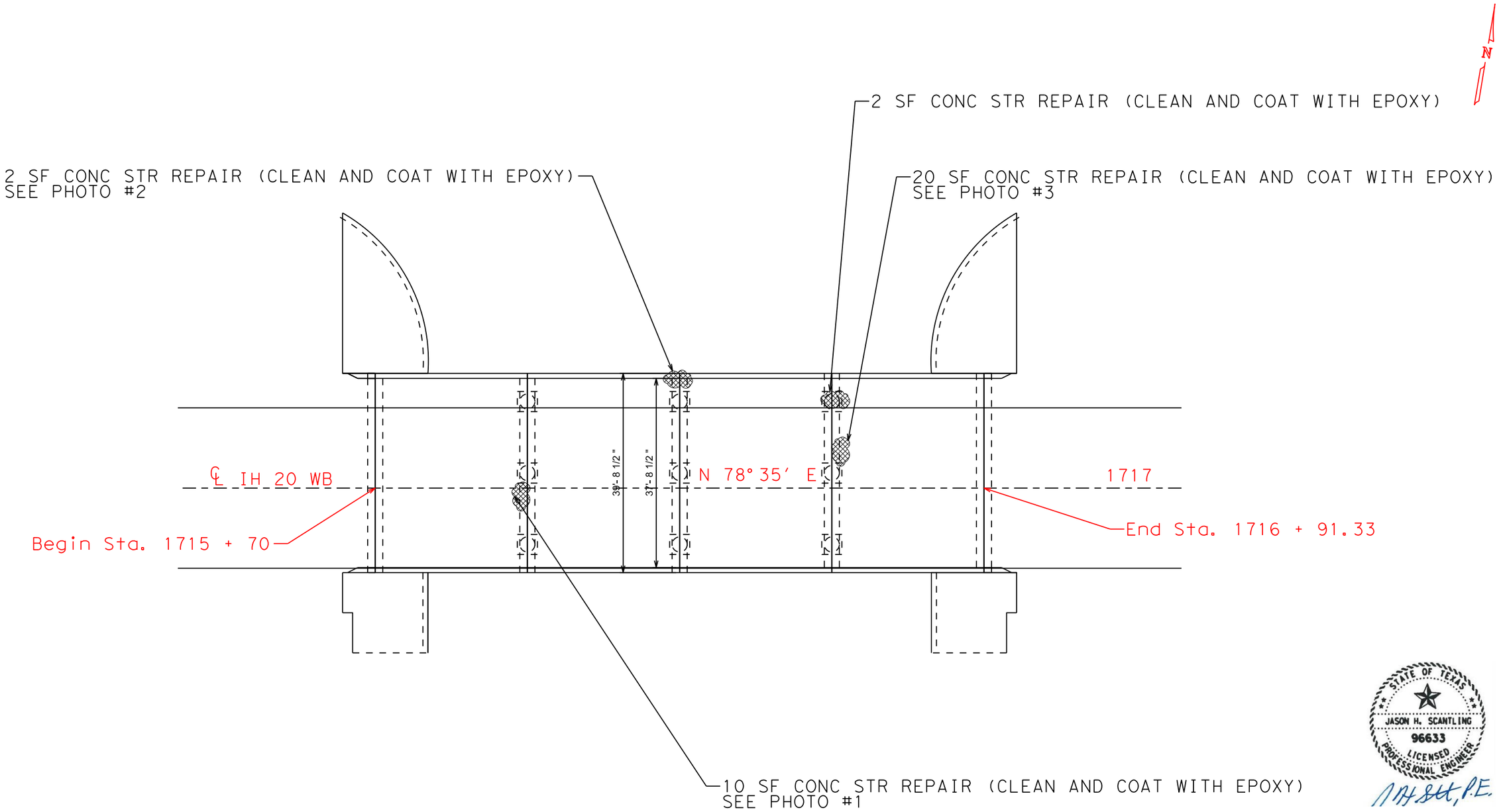

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WTH EPOXY)	34	SF

Sta. - 1715+70 - 1716+91.333
4-Span Simple Reinforced Concrete Pan Girder
On Concrete Column Bents

STATE OF TEXAS
JASON H. SCANTLING
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08/19/2021

IH 20 WB @ RUSSELL CREEK
230680000706072
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		107

DATE: 8/18/2021 4:33:42 PM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 WB RUSSELL CREEK.dgn

WEST INTERIOR BENT CAP - LOOKING EAST VIEW 6045

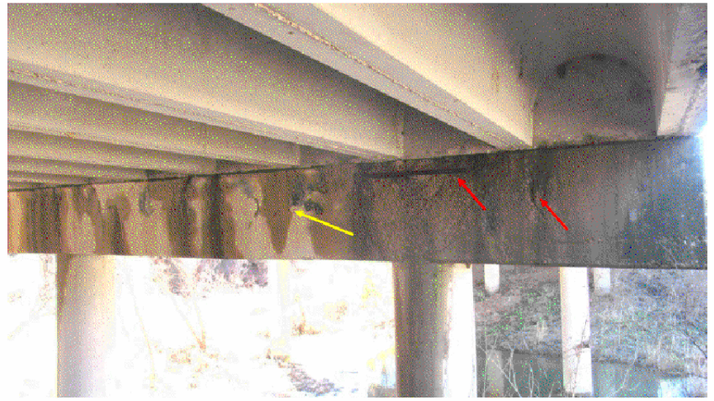
NOTE: WEST INTERIOR BENT CAP HAS 6 SQUARE FOOT DELAMINATION IN WEST FACE.
MODERATE SPALLS WITH EXPOSED REBAR IN DIAPHRAGMS BETWEEN GIRDERS 3 TO 5 FROM SOUTH.

PHOTO #1

BENT CAP 3 - LOOKING SOUTHEAST VIEW 6050

NOTE: MODERATE SPALL WITH EXPOSED REBAR AT NORTH END OF BENT CAP 3 FROM WEST.

PHOTO #2



EAST INTERIOR BENT CAP - LOOKING WEST VIEW 6054

NOTE: 4 SQUARE FOOT SPALL WITH EXPOSED REBAR & SEVERAL MINOR DELAMINATIONS IN EAST FACE OF EAST INTERIOR BENT CAP.

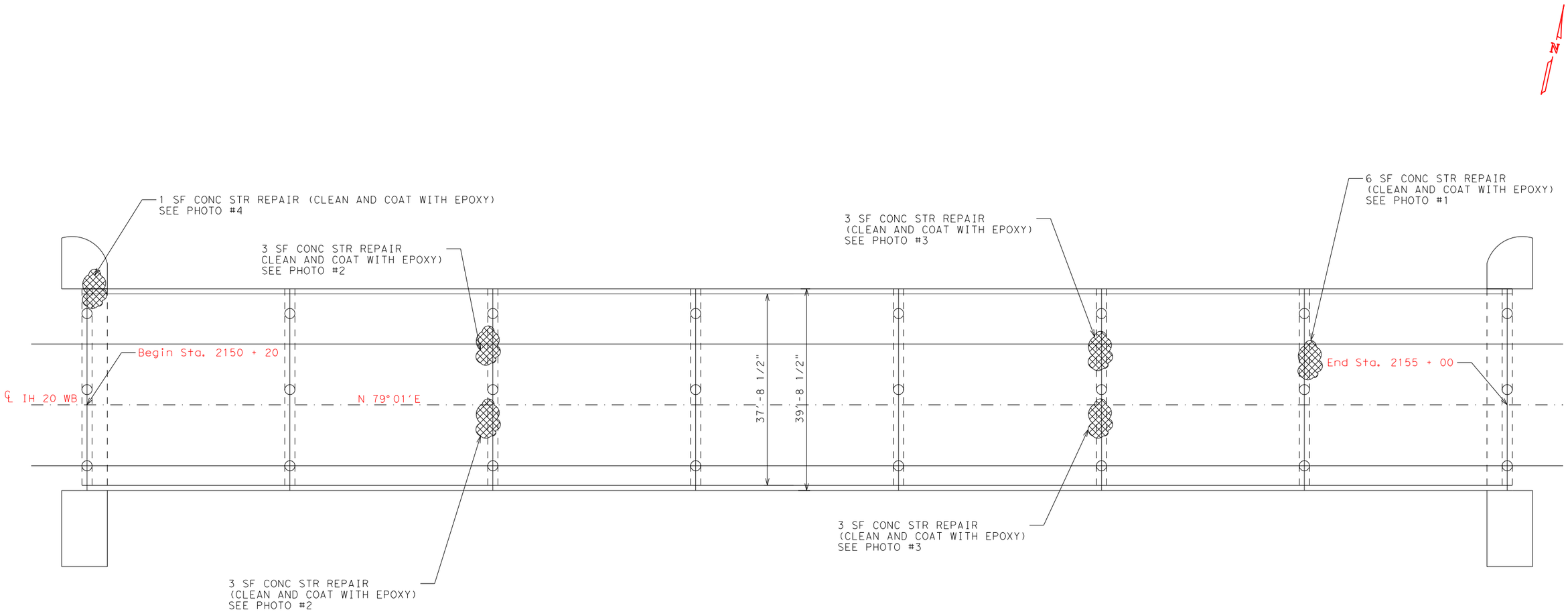
PHOTO #3

DATE: 8/18/2021 4:33:42 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 WB RUSSELL CREEK.dgn

IH 20 WB @
RUSSELL CREEK
230680000706072
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		108



NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 2150+20 - 2155+00
7 Simple Span Reinforced Concrete Pan Girder Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6002	CLEANING AND SEALING EXISTING JOINT(CL3)	320	LF
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	19	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	88	EA
427	6006	EPOXY WATERPROOF FINISH	280	SF

STATE OF TEXAS
JASON H. SCANTLING
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JHS, P.E.

09/03/2021

IH 20 WB @
S FORK PALO PINTO CREEK
230680031405036
EASTLAND CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		109

DATE: 8/31/2021 1:38:52 PM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 WB S FORK PALO PINTO CREEK .dgn

DIAPHRAGMS - LOOKING WEST VIEW 6221

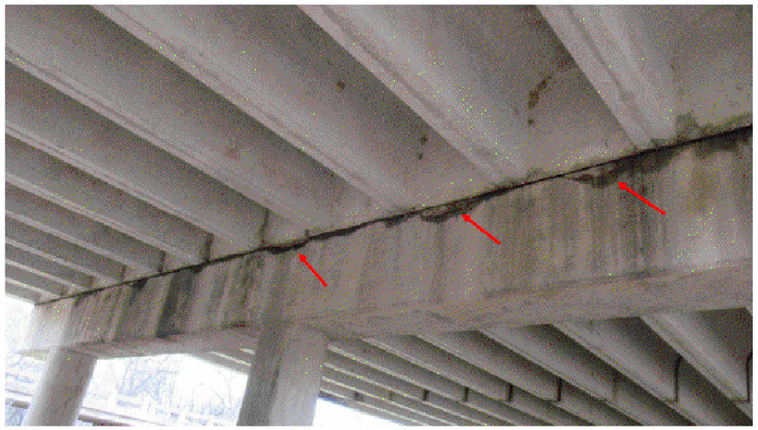
NOTE: TWO DIAPHRAGMS 5 AND 6 FROM NORTH OF EAST SPAN HAVE MODERATE SPALLS WITH EXPOSED REBAR OVER BENT 7.

PHOTO #1

BENT CAP 3 - LOOKING NORTHEAST VIEW 6227

NOTE: BENT CAP 3 FROM WEST HAS MODERATE SPALLS WITH EXPOSED REBAR ON WEST FACE. SPALLS ARE ABOVE NORTH AND CENTER COLUMN.

PHOTO #2



BENT CAP 6 - LOOKING NORTHEAST VIEW 6222

NOTE: MODERATE SPALLS ON WEST FACE, ALONG TOP EDGE OF BENT CAP 6 FROM WEST.

PHOTO #3

NORTH EXTERIOR BEAM - LOOKING SOUTHEAST VIEW 6248

NOTE: NORTH EXTERIOR BEAM OF WEST SPAN HAS MODERATE CRACKS AND SPALL AT WEST END.

PHOTO #4

IH 20 WB @
S FORK PALO PINTO CREEK
230680031405036
EASTLAND CO.

Texas Department of Transportation®

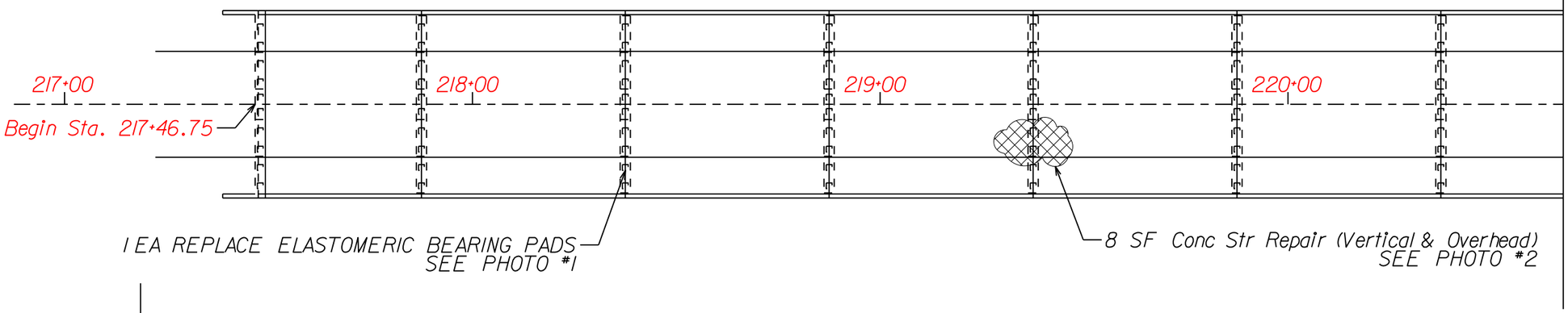
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		110

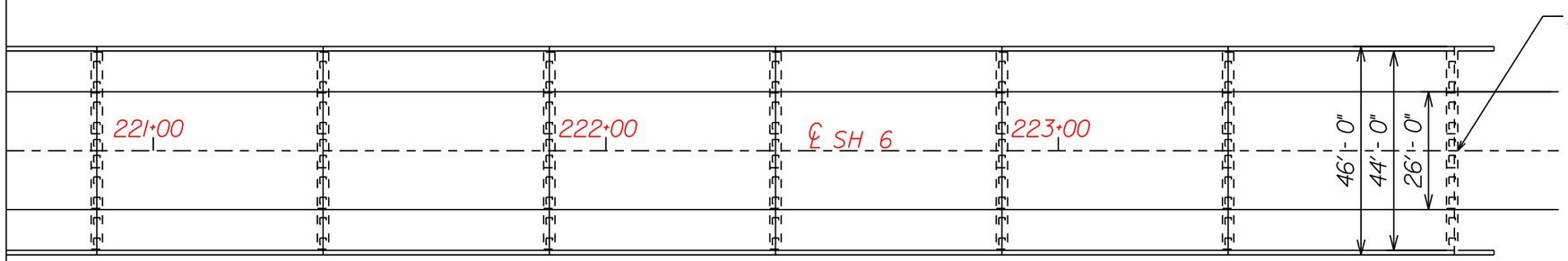
DATE: 8/18/2021 4:33:44 PM
FILE: T:\BWD\SGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\IH 20 WB S FORK PALO PINTO CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	8.0	SF
4002	6001	REPLACE ELASTOMERIC BEARING PADS	1.0	EA
495	6001	RAISING EXIST STRUCT	1.0	LS
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	644.0	LF
446	6028	SPOT CLEAN & PAINT EXIST STR(SPL PRT SYS)	1.0	LS

NOTE:DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

SPOT CLEAN AND PAINT BEARINGS AND DIAPHRAGMS (EVERY OTHER JOINT) IN ACCORDANCE WITH ITEM 446 UP TO 300 SF.





SLIPPED BEARING PAD AT BENT 2
Looking W
IMG. 154

Note: Slipped bearing pad at bent 2 beneath second beam from South.

PHOTO #1

DATE: 14 AUG 2019
COUNTY: 047
CONT-SEC: 0257-05
STR: 028

SPALL AT BENT 4 PILE
Looking n
IMG. 146

Note: Spall at base of 6th pile from North at bent 4 with exposed rebar.

PHOTO #2

Sta. 217+46.75 - 223+88.25
13 Span Steel I-Beam Bridge
On Conc Substructure widened
with PS Conc I-Beams

DATE: 8/18/2021 4:33:46 PM
FILE: ...\SH 6 LEON RIVER.dgn

STATE OF TEXAS
JASON H. SCANTLING
96633
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PROFESSIONAL ENGINEER

08/19/2021

SH 6 @
LEON RIVER
230470025705028
COMANCHE CO.

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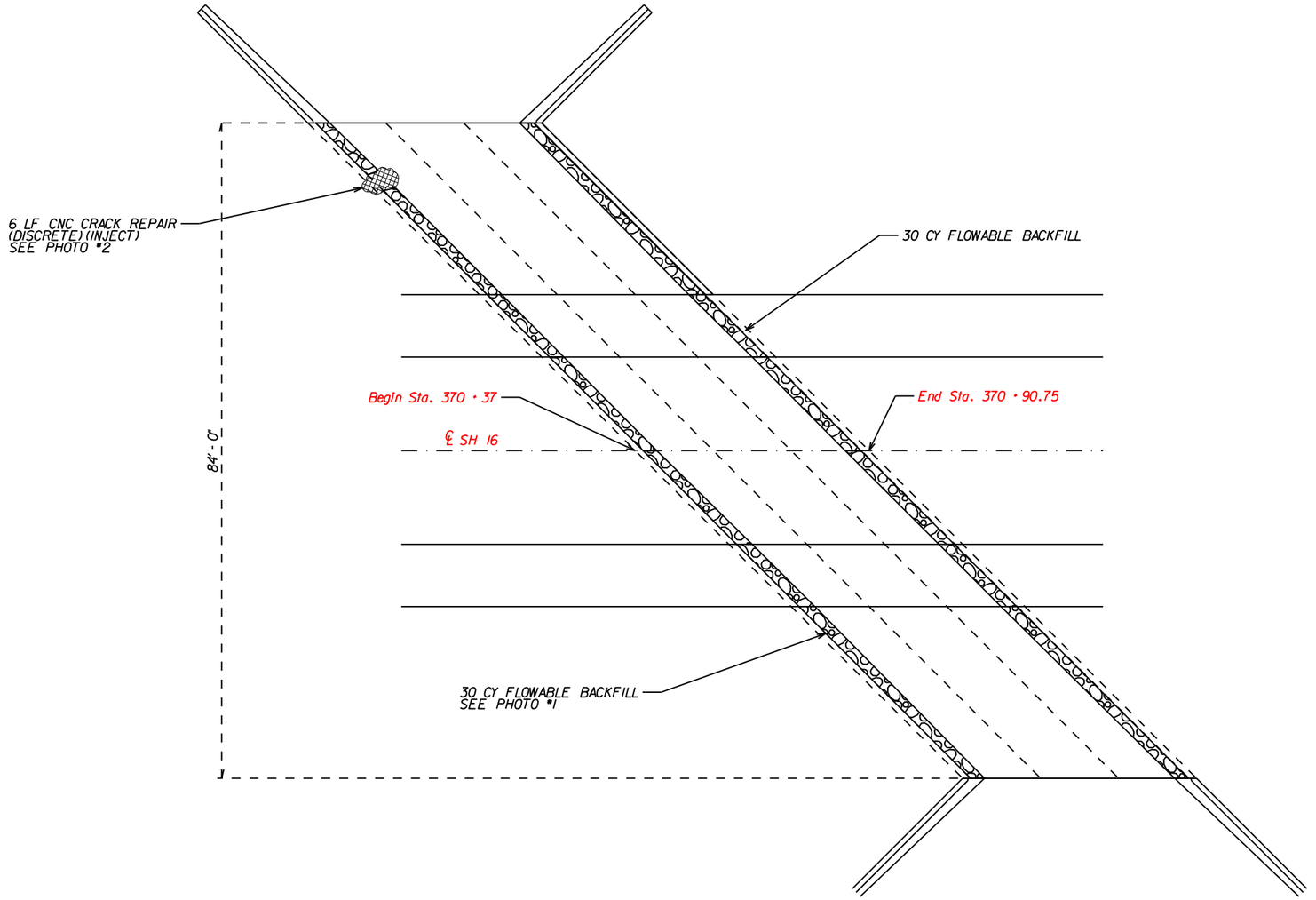
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		111

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	60	CY
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	6	LF

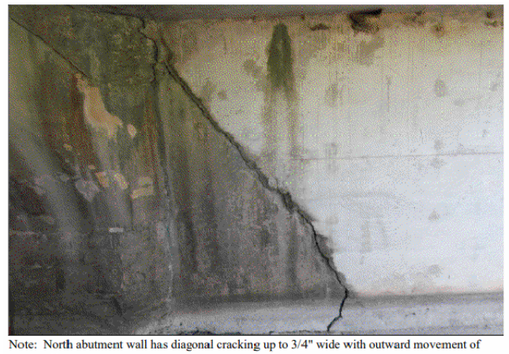


Sta. 370+37 - 370+90.75
3 - 10' x 7'
Masonry Arch Culvert on Masonry Foundation-Walls Widened on both sides with concrete boxes

SCOUR ORIGINAL MASONRY ARCHES
Looking NE
IMG. 0846

Note: Scour has exposed the masonry footings below the original masonry arches approx. 2.

PHOTO #1



DATE: 21 AUG 2019
COUNTY: 047
CONT-SEC: 0289-01
STR: 044

E EXTENSION N ABUTMENT WALL CRACKING
Looking N
IMG. 0845

Note: North abutment wall has diagonal cracking up to 3/4" wide with outward movement of approx. ½.

PHOTO #1

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08/19/2021

SH 16 @ DRAW
230470028901044
COMANCHE CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		112

DATE: 8/18/2021 4:33:48 PM
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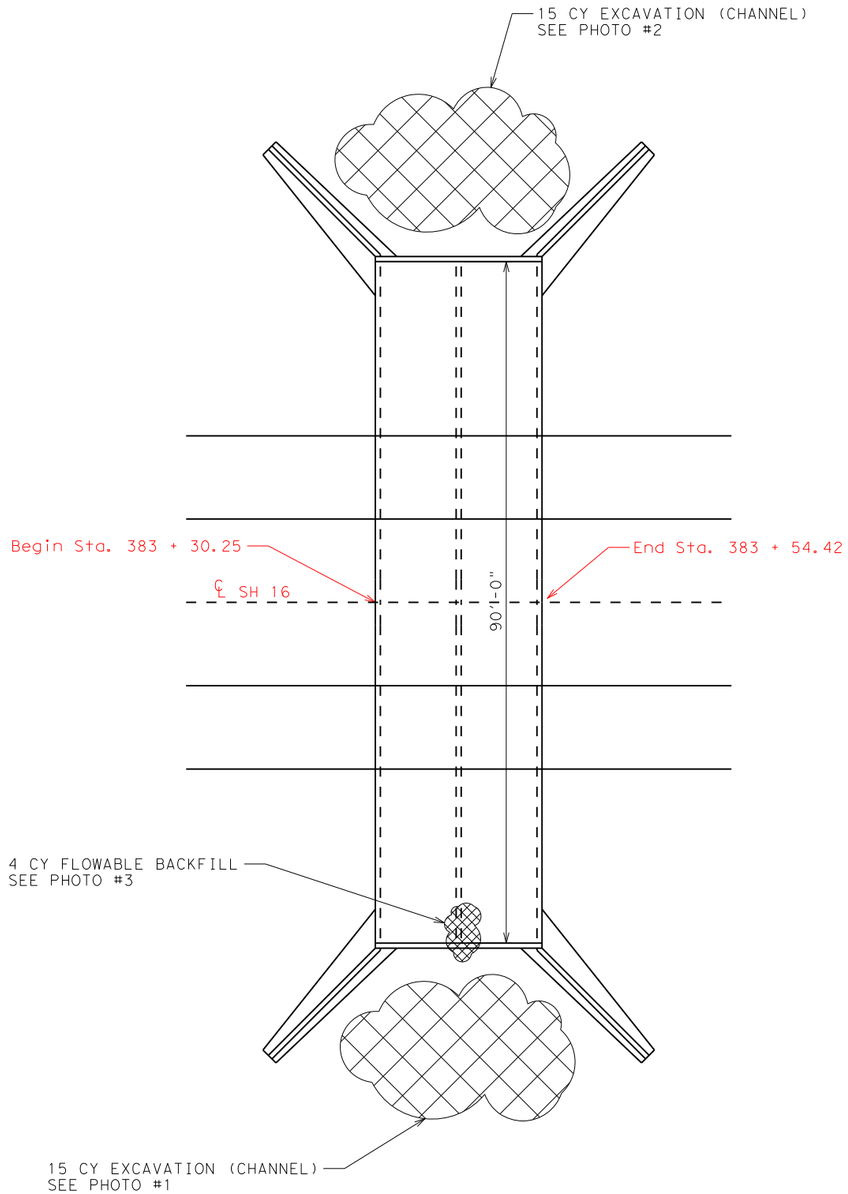

Sta. 383+30.25 - 383+54.42
2 - 10' x 8'
Masonry Arch Culvert Widened On Both Sides with
2 - 10'x8' Concrete Boxes all on spread footings

ITEM	CODE	DESCRIPTION	QUANT	UNIT
110	6002	EXCAVATION (CHANNEL)	30	CY
401	6001	FLOWABLE BACKFILL	4	CY

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08/19/2021

SH 16 @ DRAW
230470028901045
COMANCHE CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		113

DATE: 8/18/2021 4:33:49 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 DRAW 045.dgn

DN: CK: DW: CK:

DATE: 21 AUG 2019
COUNTY: 047
CONT-SEC: 0289-01
STR: 045

STREAM VIEW
Looking N

IMG. 0836

PHOTO #1

UPSTREAM VIEW
Looking NE

IMG. 0837

Note: Sediment buildup of approx. 1' with thick vegetation in upstream channel.

PHOTO #2

CHANNEL BED
SCOUR
DOWNSTREAM SIDE

Looking N

IMG. 0838

Note: Channel bed scour has exposed the interior wall footing on the downstream end approximately 1' with undermining of approximately 3'.

PHOTO #3

SH 16 @
DRAW
230470028901045
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		114

DATE: 8/18/2021 4:33:50 PM
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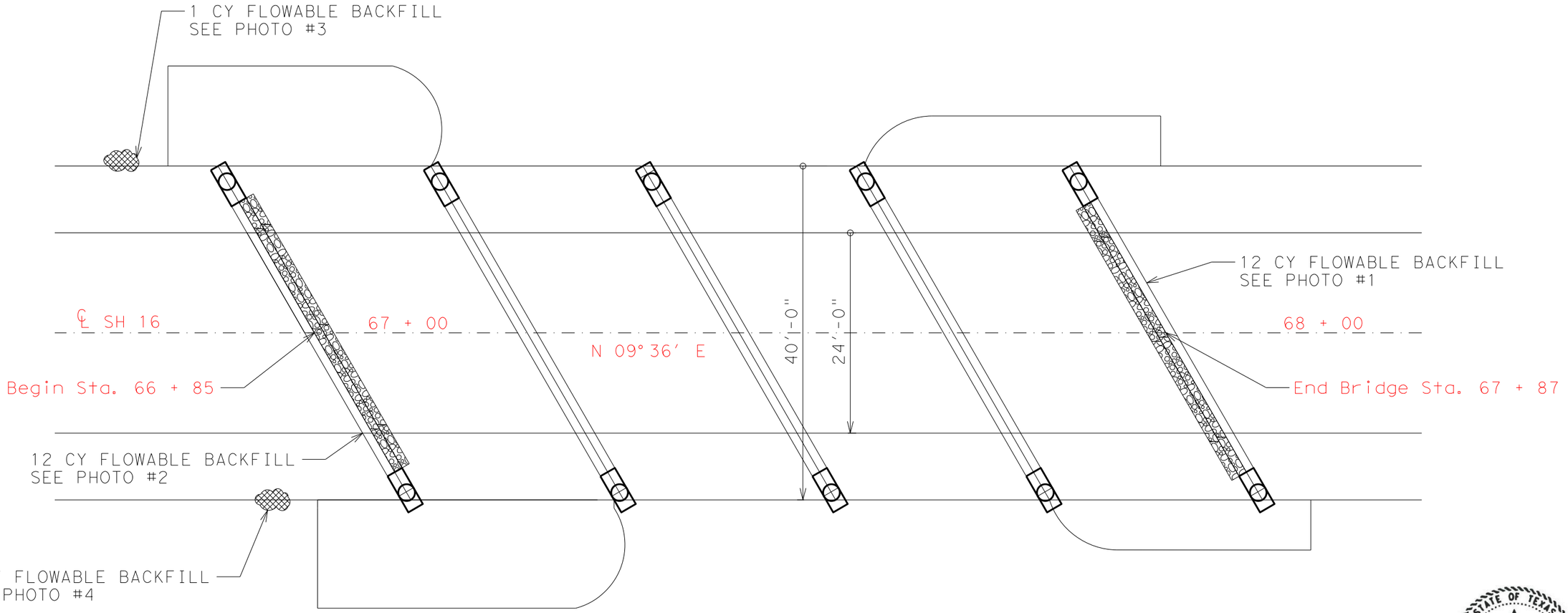

Sta 66+85 - 67+87
4 Simple Span Reinforced Conc Flat Slab Bridge
On Conc Column Bents (30° Skew)

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	26	CY

STATE OF TEXAS
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PROFESSIONAL ENGINEER

08/19/2021

SH 16 @
HOG CREEK
230680028803017
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		115

DATE: 8/18/2021 4:33:51 PM
FILE: T:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 HOG CREEK.dgn

NORTH ABUTMENT CAP - LOOKING NORTHWEST VIEW 6295

NOTE: NORTH ABUTMENT CAP IS UNDERMINED 24" BACK AND 19" DEEP.
ABUTMENT STEEL PILES ARE EXPOSED.

PHOTO #1

SOUTH ABUTMENT CAP - LOOKING SOUTHEAST VIEW 6297

NOTE: SOUTH ABUTMENT CAP IS UNDERMINED 36" BACK AND 6" DEEP.
ABUTMENT STEEL PILES ARE EXPOSED.

PHOTO #2

SOUTHWEST EMBANKMENT - LOOKING NORTHEAST VIEW 6299

NOTE: RUNOFF HAS ERODED SOUTHWEST EMBANKMENT UP TO 12" DEEP ALONG TOP OF SOUTHWEST EMBANKMENT RIPRAP.

PHOTO #3

SOUTHEAST BRIDGE CORNER - LOOKING NORTHEAST VIEW 6290

NOTE: MODERATE SETTLEMENT AND EROSION AT SOUTHEAST CORNER OF BRIDGE. EROSION IS 16" DEEP.

PHOTO #4

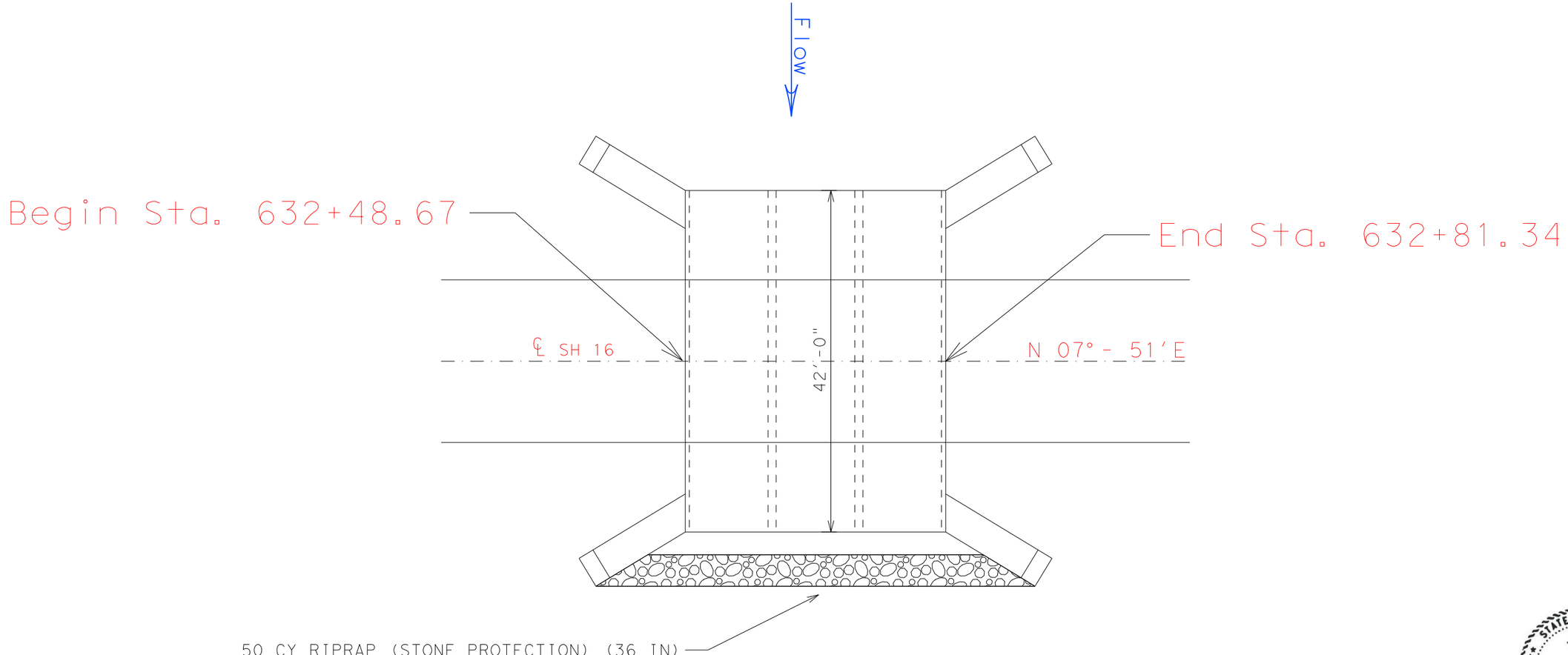
SH 16 @
HOG CREEK
230680028803017
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		116

DATE: 8/18/2021 4:33:52 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 HOG CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6037	RIPRAP (STONE PROTECTION) (36 IN)	50	CY



Sta. 632+48.67 - 632+81.34
3 Barrel 10' x 10' Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

STREAM UNDER BRIDGE - LOOKING WEST VIEW 6253

NOTE: SEVERE SOUR AND UNDERMINED UP TO 64" DEEP ALONG GIBBON APRON TOEWALL AND 32" DEEP ALONG PORTION OF WING-WALL FOOTINGS.

PHOTO #1

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

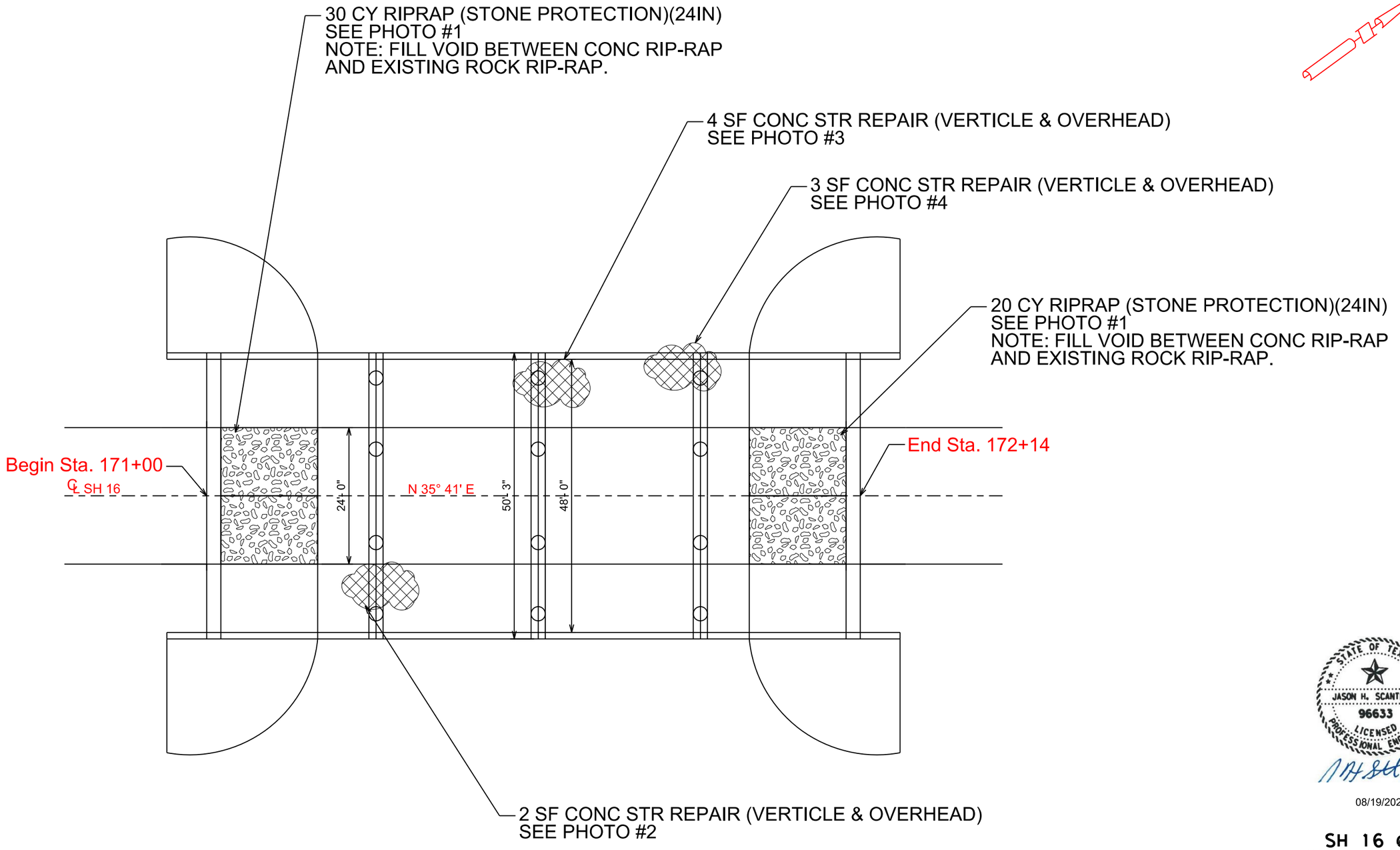
08/19/2021

SH 16 @
INDIAN CREEK
2306028803013
EASTLAND CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		117

DATE: 8/18/2021 4:33:54 PM
FILE: T:\BWD\DGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 INDIAN CREEK.dgn



Sta. 171+00 - 172+14
4-Span Simple Concrete T-Beam Bridge
Widened Both Sides With PSC Beams

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6036	RIPRAP (STONE PROTECTION) (24 IN)	50	CY
429	6007	CONC STR REPAIR (VERTICLE AND OVERHEAD)	9	CY

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER
J.H. Scantling, P.E.

08/19/2021

SH 16 @
JERRYS CREEK
232060028904037
SAN SABA CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		118

DATE: 8/18/2021 4:34:01 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 JERRYS CREEK.dgn

PHOTO #1

PHOTO #2

PHOTO #3

PHOTO #4

Sta. 171+00 - 172+14
4-Span Simple Concrete T-Beam Bridge
Widened Both Sides With PSC Beams

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS, P.E.

08/19/2021

SH 16 @
JERRYS CREEK
232060028904037
SAN SABA CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		119

DATE: 8/18/2021 4:34:02 PM
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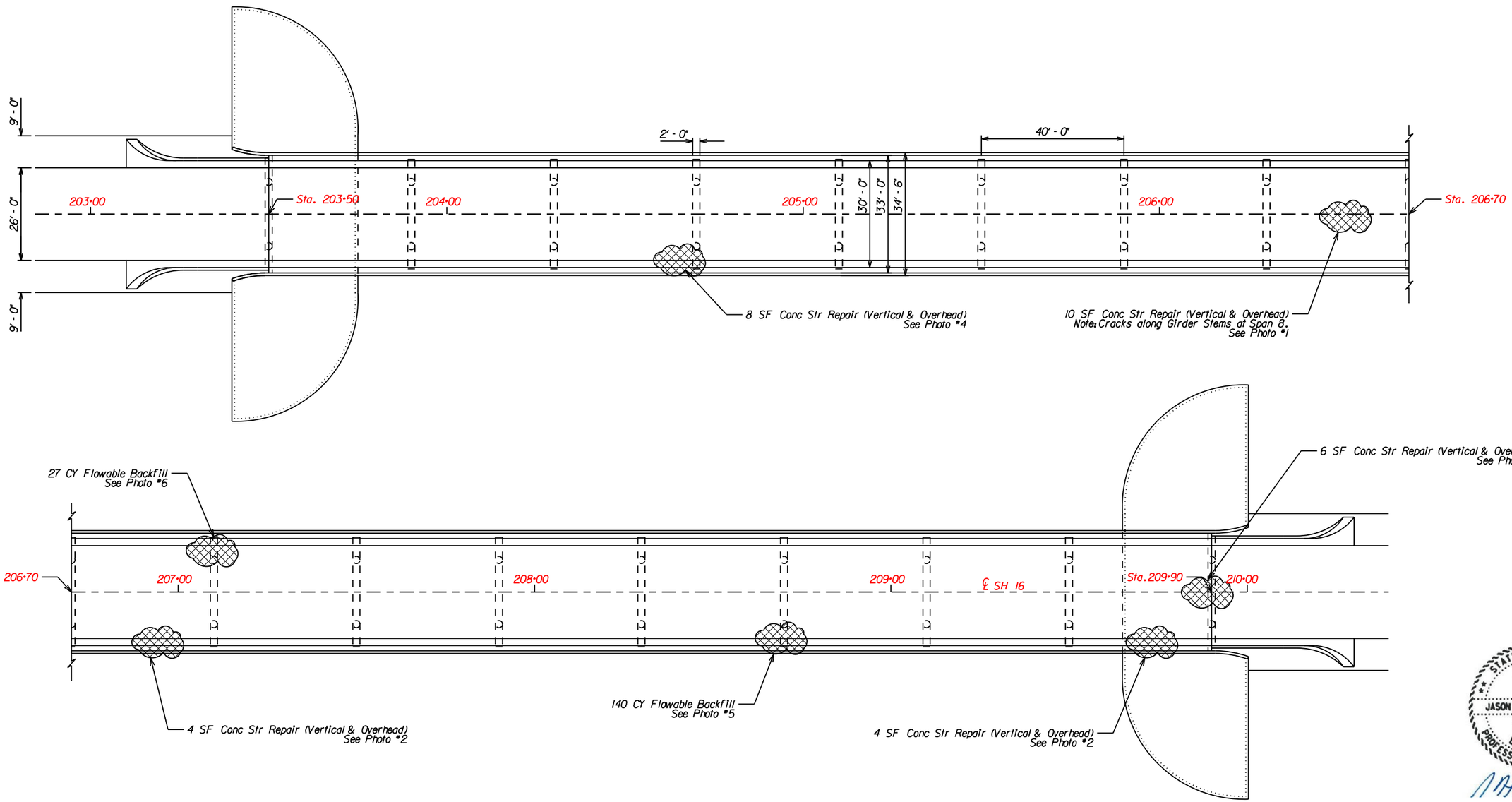

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429. EXTERIOR DRAIN HOLES SHALL BE REPAIRED WITH OPTION 1 IN REFERENCE TO PAN GIRDER DETAILS. REPAIR GIRDER STEMS PER TYPICAL GIRDER STEM REPAIR DETAIL (SEE PHOTOS #1 AND #2).

Sta. 203+50 - 209+90
16 Simple Span Concrete Pan Girder Bridge On Concrete Two Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	32	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	160	EA
401	6001	FLOWABE BACKFILL	167	CY
427	6006	EPOXY WATERPROOF FINISH	640	SF

STATE OF TEXAS
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09/03/2021

SH 16 @ SABANNA RIVER
230702880102I
COMANCHE CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039.etc.	SH 16.etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE.ETC.		120

DATE: 8/31/2021 1:52:29 PM
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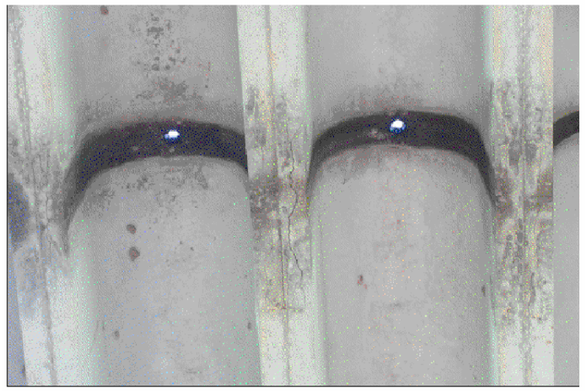


DATE: 15 AUG 2019
COUNTY: 047
CONT-SEC: 0288-01
STR: 021

CRACKS AT GIRDER STEMS
Looking N

IMG. 225

Note: Cracks along girder stems at span 8.

Photo #1

SPALLS ON OUTSIDE OF GIRDER STEM
Looking S

IMG. 219

Note: Spalls with rebar exposed on outside of girder stem at spans 9 & 16.

Photo #2

DATE: 15 AUG 2019
COUNTY: 047
CONT-SEC: 0288-01
STR: 021

SPALL AT S ABUTMENT
Looking S

IMG. 220

Note: Spalls at East end of South abutment with exposed rebar.

Photo #3

SPALLS AT BENT CAP 3
Looking S

IMG. 224

Note: Spalls with rebar exposed on bent cap 3.

Photo #4

DATE: 15 AUG 2019
COUNTY: 047
CONT-SEC: 0288-01
STR: 021

EXPOSED DRILLED SHAFT AT BENT 13
Looking N

IMG. 222

Note: Drilled shaft at bent 13 exposed approximately 3'.

Photo #5

DATE: 15 AUG 2019
COUNTY: 047
CONT-SEC: 0288-01
STR: 021

DRILLED SHAFT EXPOSED AT BENT 9
Looking E

IMG. 226

Note: Drilled shaft at bent 9 exposed approximately 4'.

Photo #6

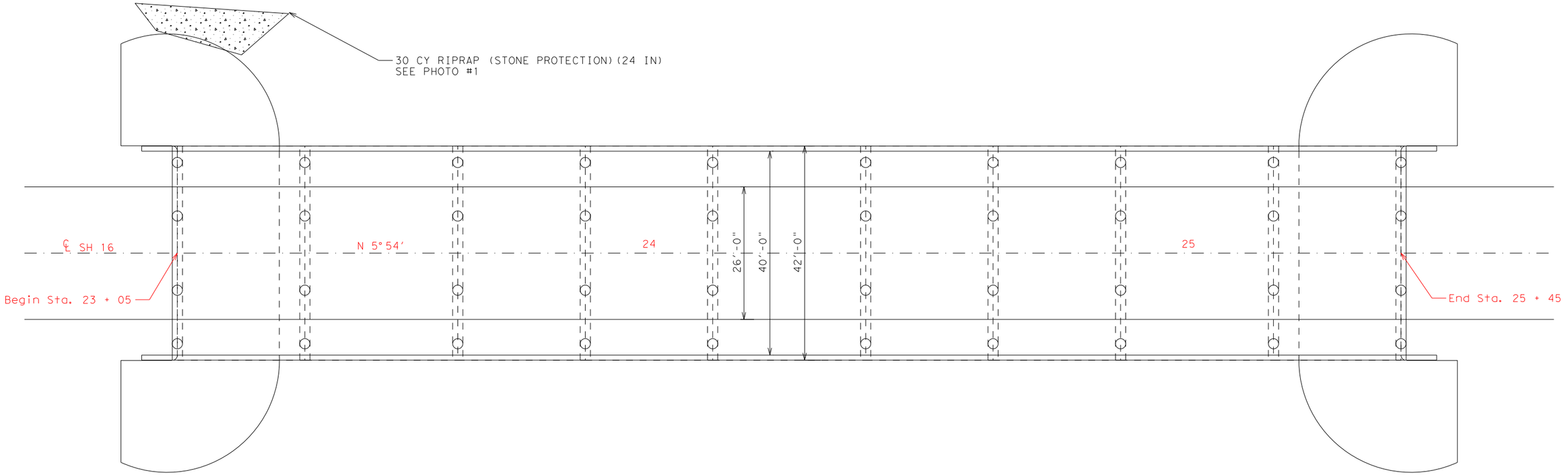
Sta. 203+50 - 209+90
16 Simple Span Concrete Pan Girder Bridge On Concrete Two Column Bents

SH 16 @ SABANNA RIVER
2304702880102I
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		121

DATE: 8/19/2021 8:28:02 AM
FILE: T:\BWD\SGTE\NV\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 SABANNA RIVER.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6037	RIPRAP (STONE PROTECTION) (24 IN)	30	CY



Sta. 23+05 - 25+45
9 Span Continuous (3-3 Span units)
Concrete Flat Slab Bridge

Note: Channel bank erosion at the SW drainage ditch has exposed the concrete riprap toewall Approx. 3'

PHOTO #1

DATE: 23 OCT 2019
COUNTY: 206
CONT-SEC: 0289-04
STR: 047

EROSION AT SW RIPRAP

Looking N

IMG. 182

STATE OF TEXAS
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08/19/2021

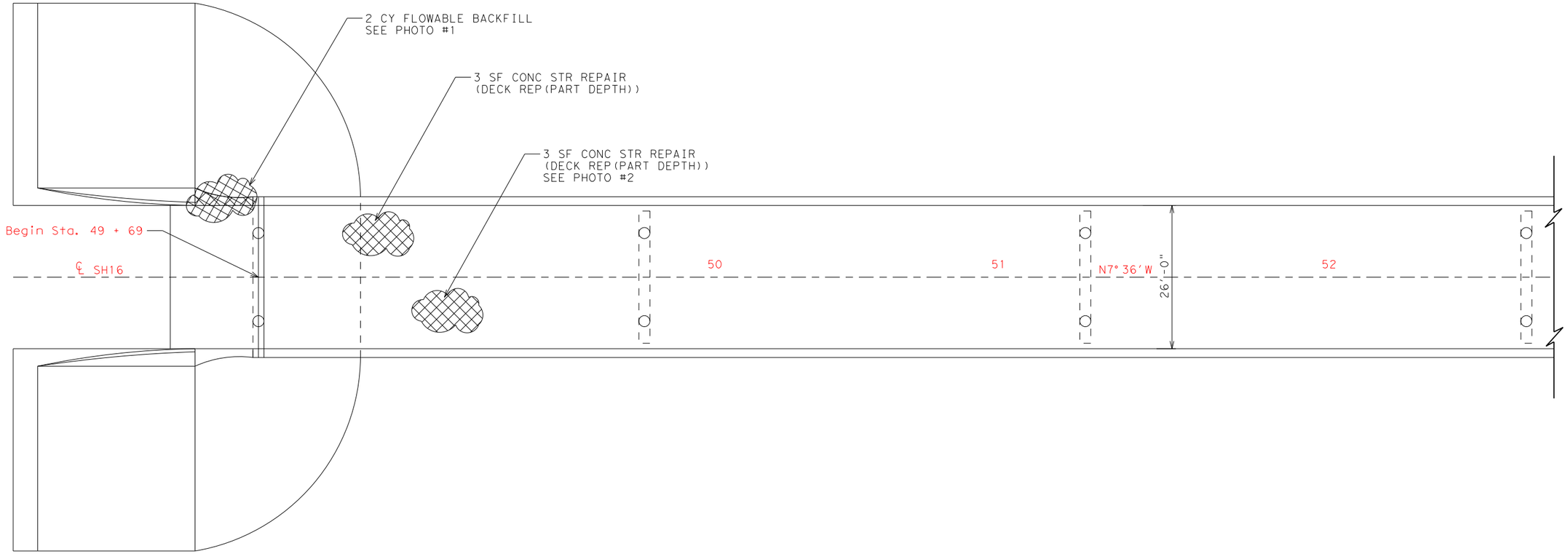
SH 16 @
SAN SABA RIVER RELIEF
232060028904047
SAN SABA CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		122

DATE: 8/18/2021 4:34:07 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 SAN SABA RIVER RELIEF.dgn

DN: CK: DW: CK:

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6003	CONC STR REPAIR (DECK REP(PART DEPTH))	9	SF
401	6001	FLOWABLE BACKFILL	2	CY



Sta. 49+69 - 54+41
6 Span Continuous Steel Stinger Bridge
Widened both Sides with PSC Beams

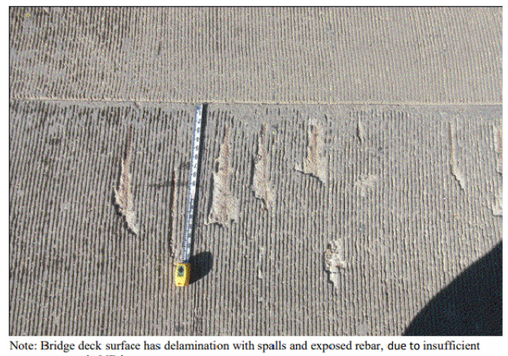
DATE: 23 OCT 2019
COUNTY: 206
CONT-SEC: 0289-04
STR: 048

EROSION AT SW WINGWALL
Looking E

IMG. 189

Note: Erosion at Southwest wingwall.

PHOTO #1



SPALLS IN BRIDGE DECK
Looking W

IMG. 188

Note: Bridge deck surface has delamination with spalls and exposed rebar, due to insufficient concrete cover in NB lane.

PHOTO #2

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08/19/2021

SH 16 @
SAN SABA RIVER
232060028904048
SAN SABA CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		123

DATE: 8/18/2021 4:34:08 PM
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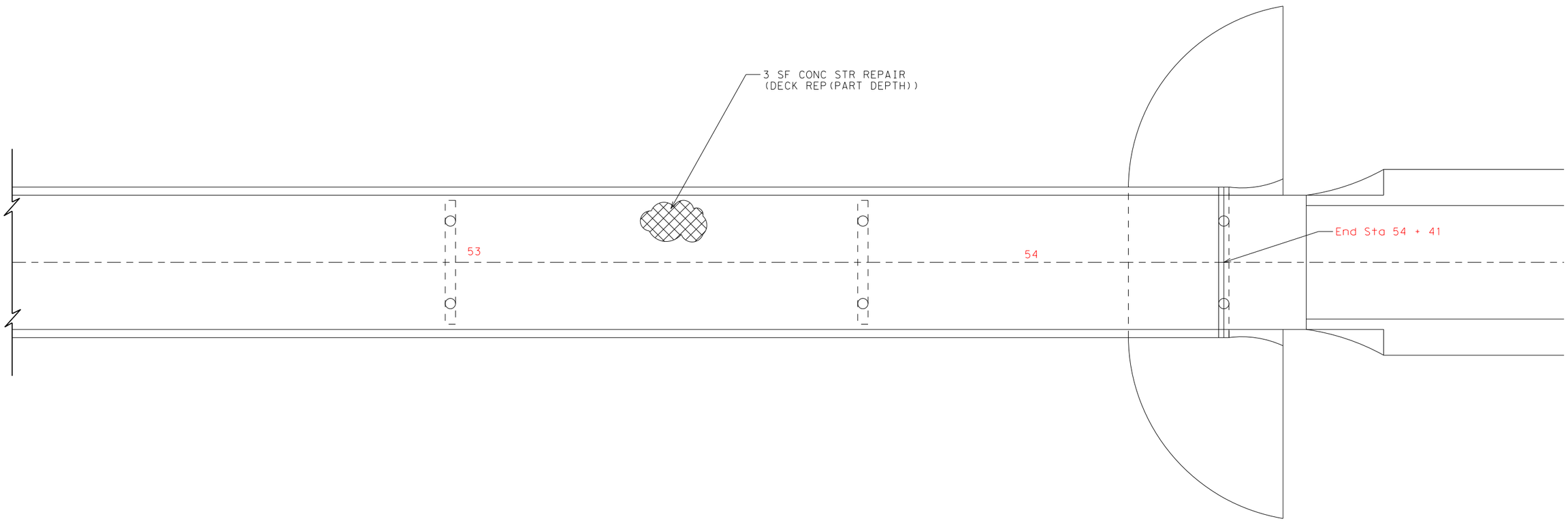

DATE: 8/18/2021 4:34:09 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 16 SAN SABA RIVER.dgn

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08/19/2021

SH 16 @
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232060028904048
SAN SABA CO.

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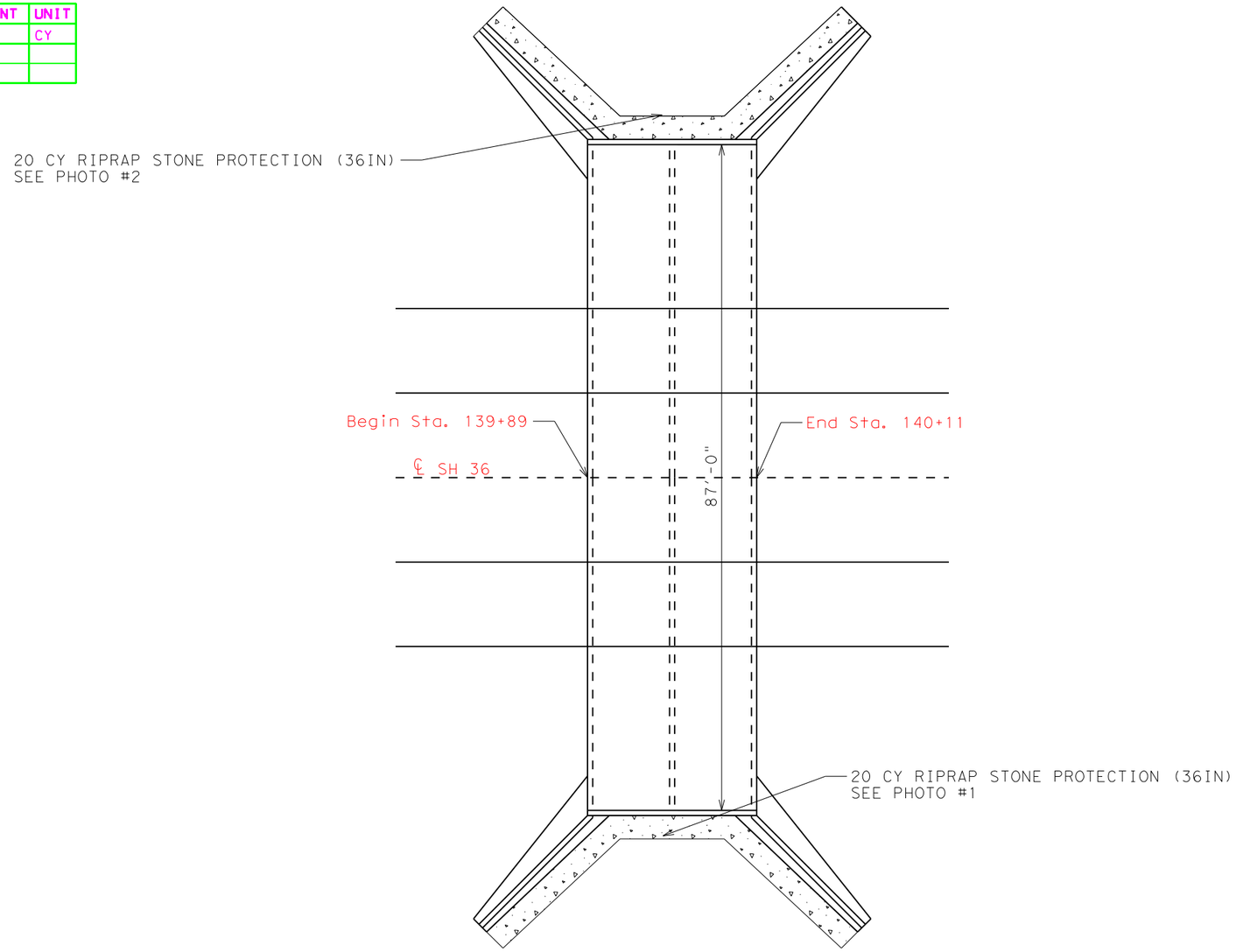
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		124

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6037	RIPRAP (STONE PROTECTION) (36 IN)	40	CY



ELEVATION VIEW - LOOKING NORTHWEST VIEW 976

NOTE: ADVANCED SCOUR 30" DEEP WITH 1' OF UNDERMINING ALONG DOWNSTREAM TOEWALL

PHOTO #1

UPSTREAM TOEWALL - LOOKING SOUTHEAST VIEW 970

NOTE: ADVANCED SCOUR 3' DEEP WITH SLIGHT UNDERMINING ALONG UPSTREAM TOEWALL.

PHOTO #2

Sta. 139+89 - 140+11
2 Barrel 10' x 10' Reinforced Concrete Culvert
With Cast In Place Concrete Wingwalls

DATE: 8/18/2021 4:34:13 PM
FILE: ...\SH 36 DRAW 018.dgn

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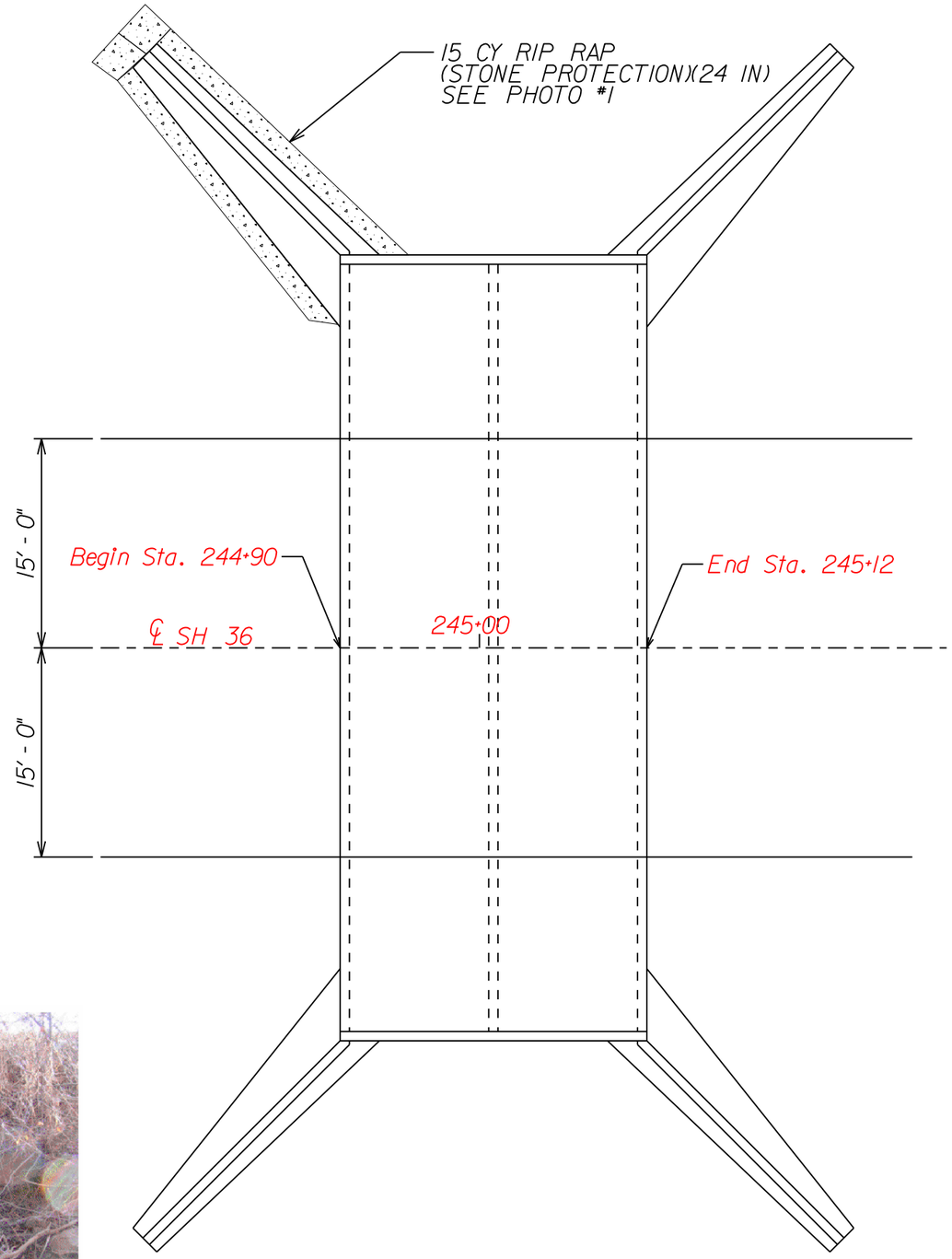
08/19/2021

SH 36 @
DRAW
230680045201018
EASTLAND CO.

SHEET OF
Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		125

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIP RAP (STONE PROTECTION)(24 IN)	15	CY



VIEW 982

NORTHWEST WINGWALL - LOOKING SOUTHEAST

NOTE: MODERATE TO ADVANCED EROSION BEHIND NORTHWEST WINGWALL, EXTENDING HALF OF WINGWALL LENGTH.

PHOTO #1

Sta. 244+90 - 245+12
2 - 10' x 10'
Reinforced Concrete Box
Culvert With Cast In Place
Concrete Wingwalls

DATE: 8/18/2021 4:34:15 PM
FILE: ...\SH 36 DRAW 019.dgn

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08/19/2021

SH 36 @
DRAW
23068004520101 9
COMANCHE CO.

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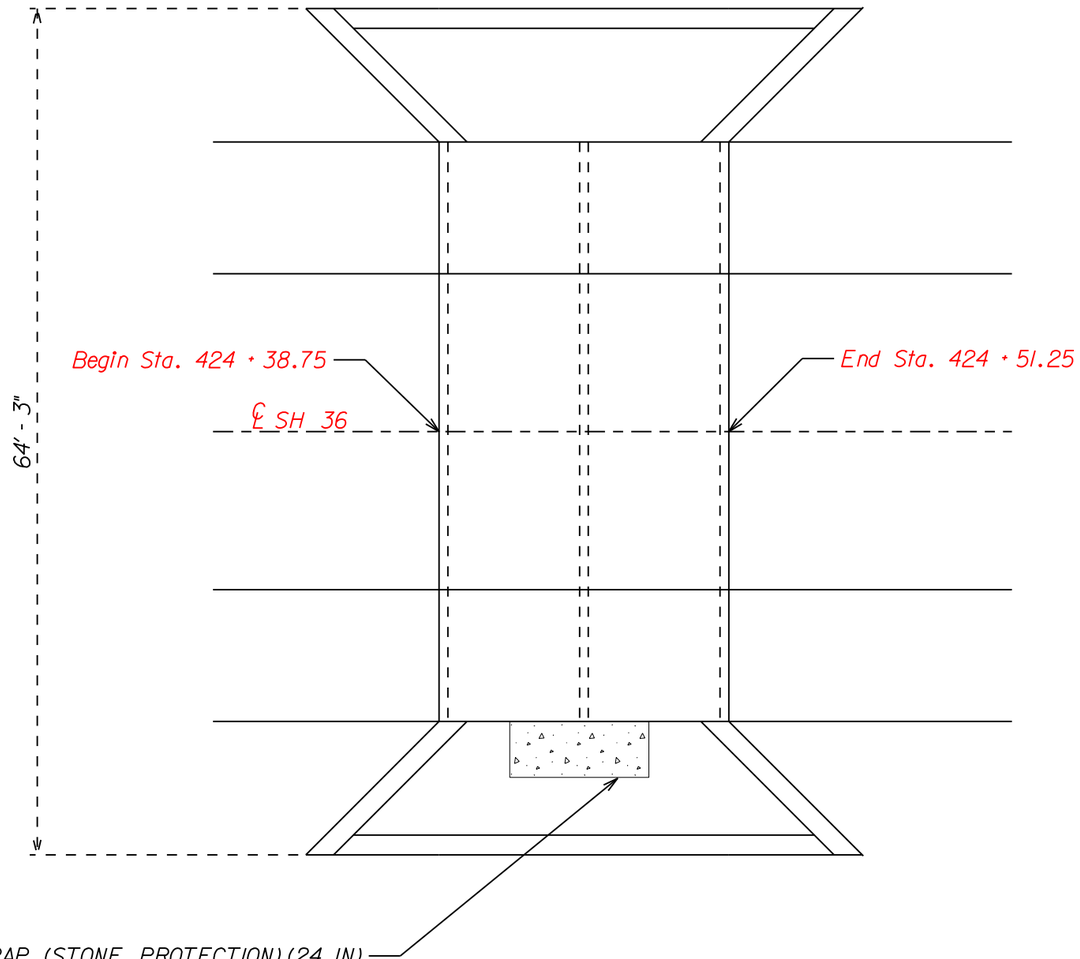
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		126

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION)(24 IN)	10	CY



CHANNEL BED
SCOUR UPSTREAM
END

Looking NE

IMG. 0727

Note: Channel bed scour at upstream end has exposed culvert footing up to 1.5' over a 15' length.

PHOTO #1

Sta. 424+38.75 - 424+51.25
2 - 10' x 10'
Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

DATE: 8/19/2021 11:02:59 AM
FILE: ...\SH 36 SALT CREEK.dgn

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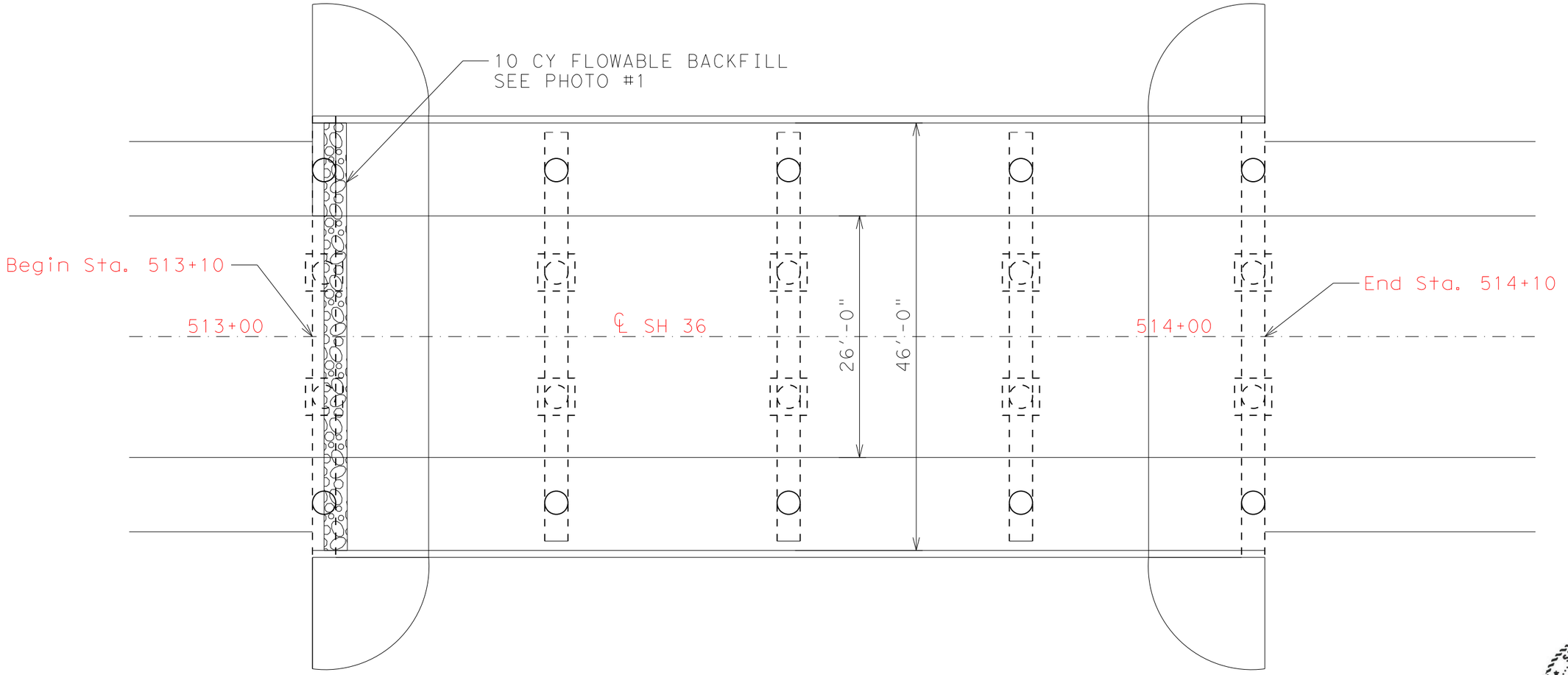
08/19/2021

SH 36 @
SALT CREEK
230470018301027
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		127

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	10	CY



Note: Scour and erosion on the NW channel bank has undermined the NW abutment cap over a 20' of length and 1' below and 2.5' back beneath.

PHOTO #1

DATE: 22 AUG 2019
COUNTY: 047
CONT-SEC: 0182-02
STR: 009

UNDERMINING OF
NW ABUTMENT CAP

Looking NW

IMG. 0922

Sta. 513+10 - 514+10
4 Span Continuous Reinforced Concrete Flat Slab Bridge
On Concrete Column Bents

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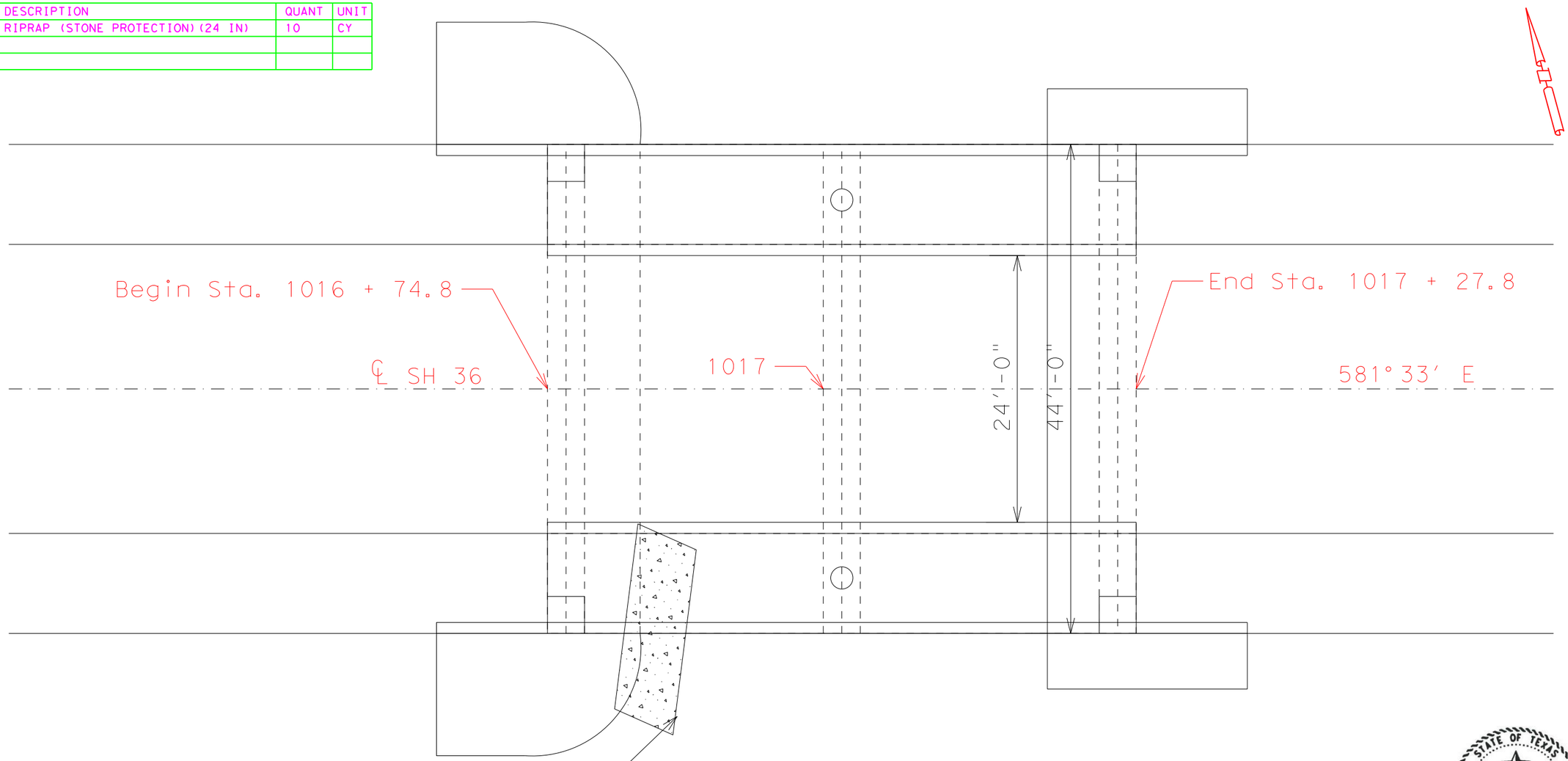
08/19/2021

SH 36 @
STAGG CREEK
230470018202009
COMANCHE CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		128

DATE: 8/18/2021 4:34:18 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 36 STAGG CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION)(24 IN)	10	CY



10 CY RIPRAP(STONE PROTECTION) (24 IN)
SEE PHOTO #1

Sta. 1016+74.8 - 1017+27.8
2 Simple Span Reinforced
Concrete T-Beam Bridge
Widened with Flat Slabs
On Concrete Pile Bents

Note: Channel bed scour has exposed approx. 2.5' of concrete riprap toe of West abutment riprap at SW corner.

PHOTO #1

DATE: 19 AUG 2019
COUNTY: 047
CONT-SEC: 0183-01
STR: 044

SCOUR W
ABUTMENT RIPRAP
Looking W

IMG. 0567

STATE OF TEXAS
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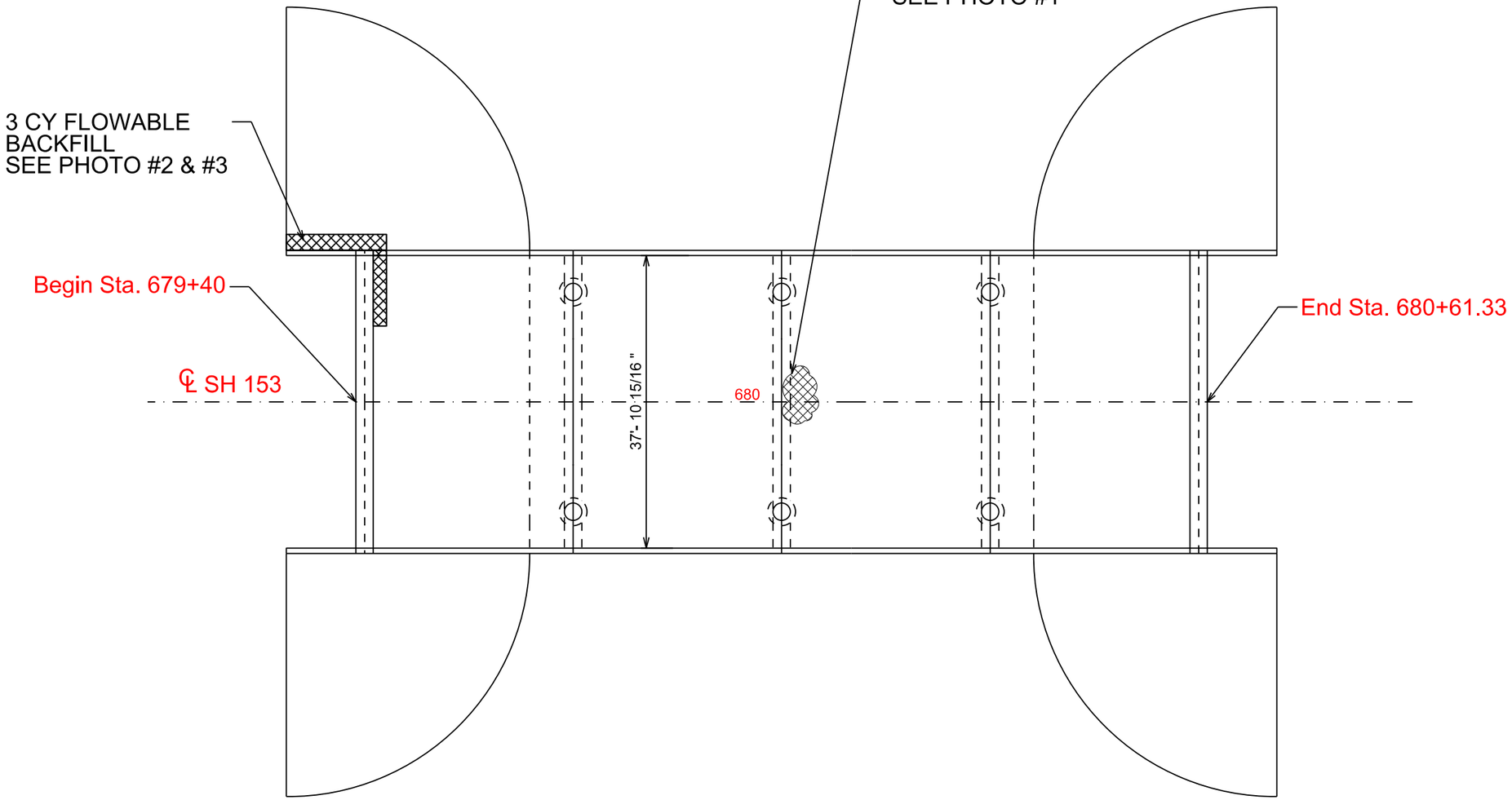
SH 36 @
TATUM BRANCH
230470018301044
COMANCHE CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		129

DATE: 8/18/2021 4:34:19 PM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 36 TATUM BRANCH.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	80	SF
401	6001	FLOWABLE BACKFILL	3	CY



Sta. 679+40 - 680+61.333
4-span simple reinforced
concrete pan girder
bridge on concrete
column bents

DATE: 15 JUL 2019
COUNTY: 042
CONT-SEC: 0636-01
STR: 009

DELAMINATIONS AT
BENT 4 CAP

Looking E

IMG. 0103

Note: West face of original center bent cap has moderate delamination with efflorescence at previous patched locations running full length.

PHOTO #1

PHOTO #2

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08/19/2021

SH 153 @
N PRONG HORDS CREEK
230420063601009
COLEMAN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		130

DATE: 8/18/2021 4:34:21 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 153 N PRONG HORDS CREEK.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	4	SF
110	6002	EXCAVATION (CHANNEL)	15	CY

DATE: 16 JUL 2019
COUNTY: 042
CONT-SEC: 0078-03
STR: 003

STREAM VIEW
Looking W

IMG. 0169

Note: Sediment buildup with vegetation in downstream channel.

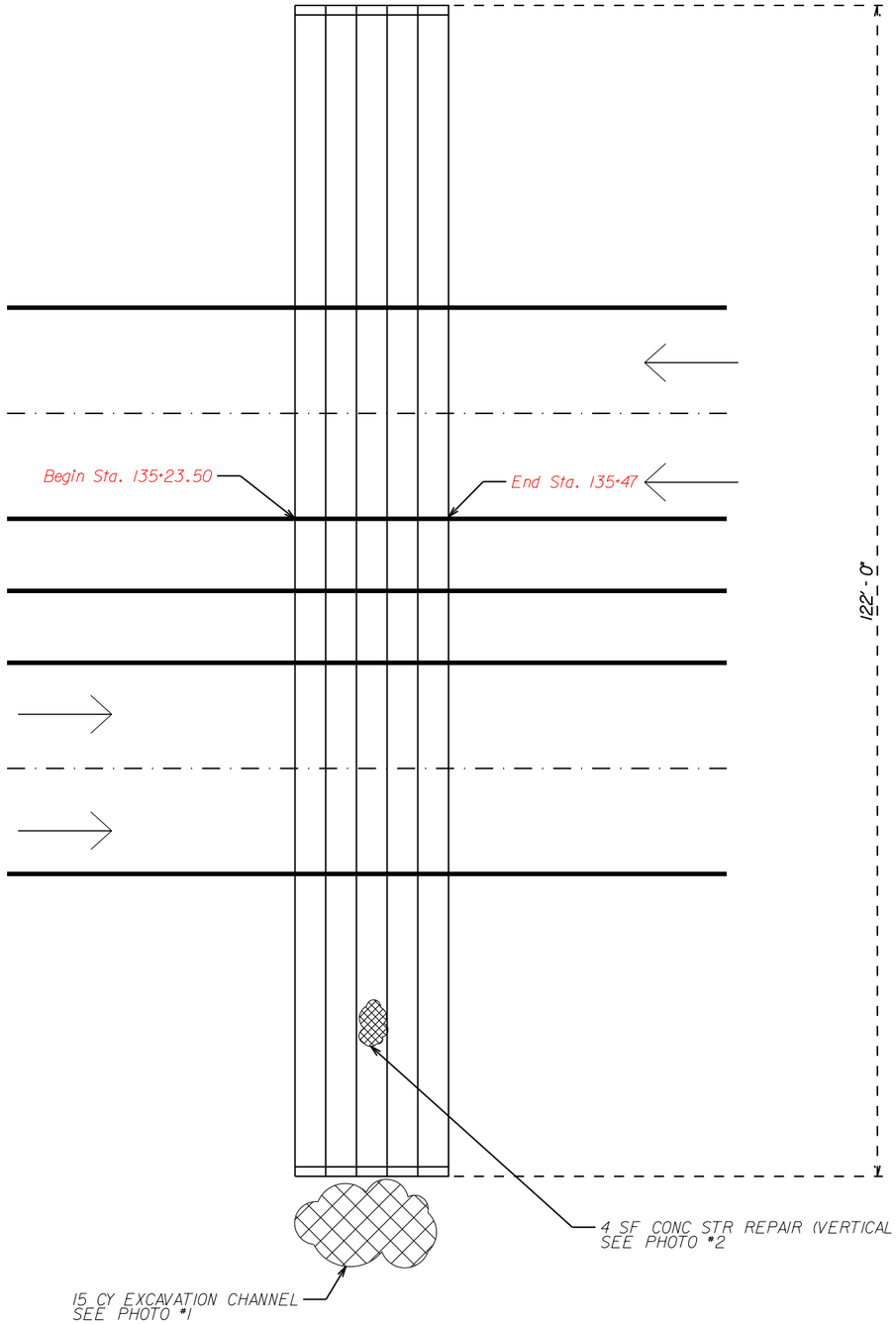
PHOTO #1

SPALL TOP SLAB
CENTER BARREL

Looking E

IMG. 0170

PHOTO #2



Sta. 135+23.50 - 135+47
5 - 4' x 4'
Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

STATE OF TEXAS
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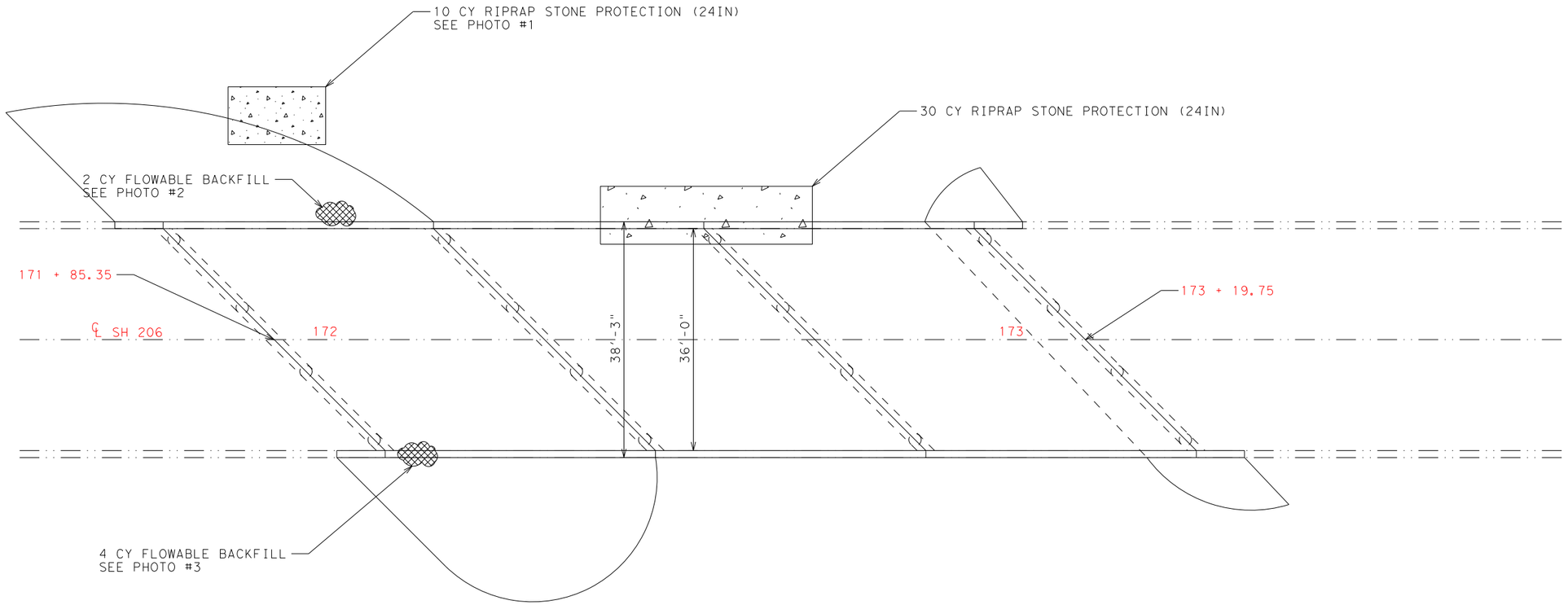
P.E.

09/07/2021

SH 206 @
DRAW
230420007803003
COLEMAN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		131

DATE: 9/7/2021 12:03:19 PM
FILE: ...\SH 206 DRAW.dgn



NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 171+85.35 - 173+19.75
3 Simple Span Reinforced Concrete Pan Girder Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	6	CY
432	6035	RIPRAP (STONE PROTECTION)(24 IN)	40	CY
429	6023	CONC STR REPAIR(PAN GIRDER HOLE REPR)	36	EA
427	6006	EPOXY WATERPROOF FINISH	120	SF

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SH 206 @ LOVE CREEK
230680263801008
EASTLAND CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		132

DATE: 8/31/2021 2:00:53 PM
FILE: T:\BWD\STEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 206 LOVE CREEK.dgn

NORTHEAST EMBANKMENT RIPRAP - LOOKING NORTHWEST VIEW 853

NOTE: EAST EDGE OF NORTHEAST EMBANKMENT RIPRAP IS EXPOSED 3' DEEP.

PHOTO #1

NORTHEAST EMBANKMENT RIPRAP - LOOKING NORTH VIEW 854

NOTE: MAJORITY OF NORTHEAST EMBANKMENT RIPRAP IS UNDERMINED.

PHOTO #2

NORTHWEST EMBANKMENT RIPRAP - LOOKING NORTHWEST VIEW 852

NOTE: LOCALIZED BUCKLING AND FRACTURE CRACKS IN NORTHWEST EMBANKMENT RIPRAP. SETTLEMENT UP TO 4" DEEP.

PHOTO #3

DN: CK: DW: CK:

DATE: 8/18/2021 4:34:24 PM
FILE: T:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 206 LOVE CREEK.dgn

SH 206 @
LOVE CREEK
230680263801008
EASTLAND CO.

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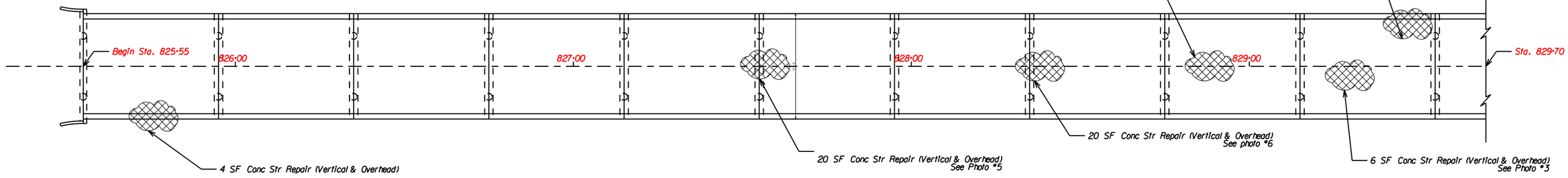
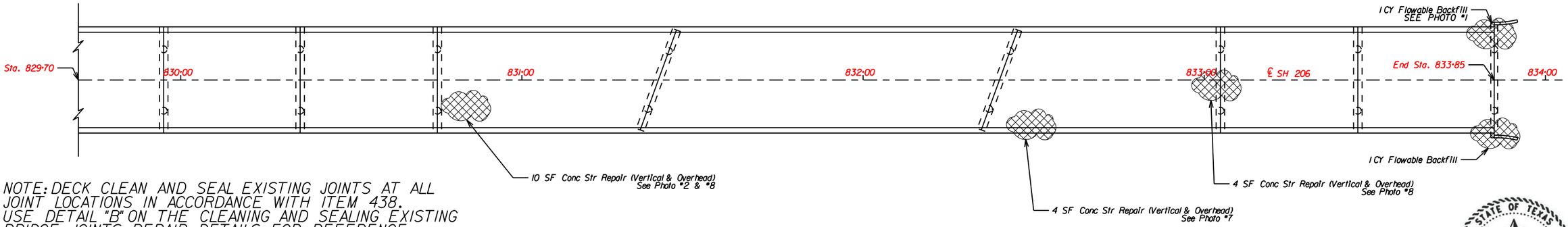
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		133





NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

NOTE: Spot Clean and Paint Bearings in accordance with item 446 up to 300 SF.

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

REPAIR GIRDER STEMS PER TYPICAL GIRDER STEM REPAIR DETAIL (SEE PHOTO #4).

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 825+55 - 833+85
18 Span Bridge (3 Contnuous Steel I-Beam Main Spans and 15 Concrete Pan Girder Approach Spans) On Concrete Substructure

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	2	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	84	SF
429	6001	CLEANING AND SEALING EXISTING JOINTS	593	LF
446	6010	CLEAN AND PAINT EXIST STR (SYSTEM 1-A)	1	LS
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	150	EA
427	6006	EPOXY WATERPROOF FINISH	720	SF

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09/03/2021

SH 206 @ PECAN BAYOU
230420045203021
COLEMAN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		134

DATE: 8/31/2021 2:18:09 PM
FILE: T:\BWD\DGS\TEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 206 PECAN BAYOU.dgn

DATE: 18 JUL 2019
COUNTY: 042
CONT-SEC: 0452-03
STR: 021

EMBANKMENT EROSION AT NE WINGWALL

Looking W

IMG. 0383

Note: The NE and SE wingwall has eroded approximately 6'x1'x1.5' deep.

PHOTO #1

SPALLED CAP AT BENT 14

Looking E

IMG. 0390

Note: The interior bent caps have minor to moderate delamination, cracks, and spalls with efflorescence and exposed rebar.

PHOTO #2

DATE: 18 JUL 2019
COUNTY: 042
CONT-SEC: 0452-03
STR: 021

DELAMINATED CAP AT BENT 10

Looking SW

IMG. 0386

PHOTO #3

PHOTO #4

PHOTO #5

PHOTO #6

SPALLED CURB AT SPAN 16

Looking S

IMG. 0372

Note: Curbs have minor to moderate cracks, spalls, and scales. The South curb at span 16 has several cover spalls with exposed rebar.

PHOTO #7

DATE: 18 JUL 2019
COUNTY: 042
CONT-SEC: 0452-03
STR: 021

SPALLED END DIAPHRAGMS AT BENT 14

Looking W

IMG. 0389

Note: The backside of the concrete diaphragms at bent 14 and 17 have widespread delamination and spalls with exposed rebar.

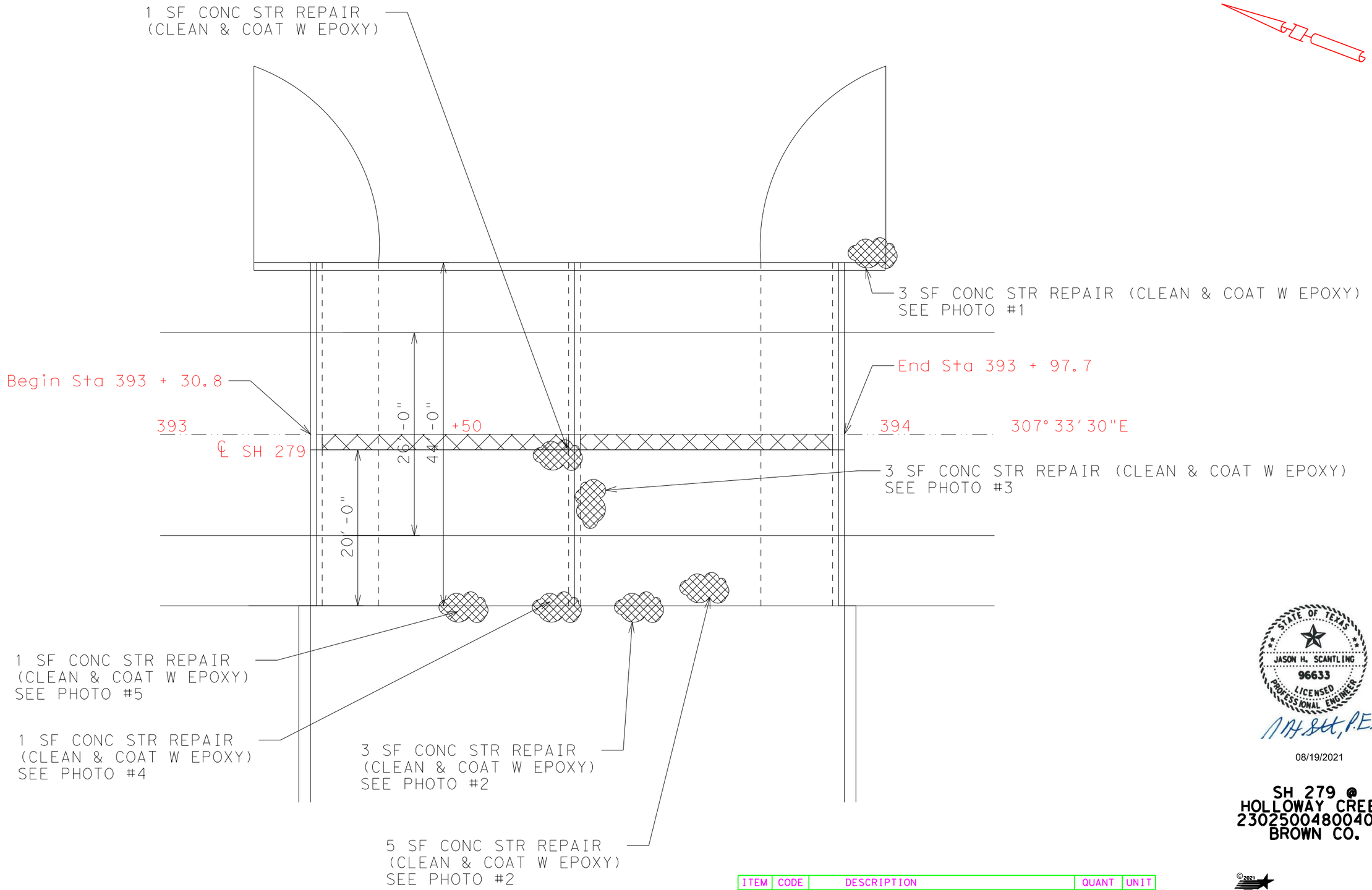
PHOTO #8

SH 206 @ PECAN BAYOU
230420045203021
COLEMAN CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		135

DATE: 8/18/2021 4:34:31 PM
FILE: T:\BMDOSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 206 PECAN BAYOU.dgn



ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WITH EPOXY)	17	SF

Sta. 393+30.8 - 393+97.7
2 Simple Span Reinforced Concrete T-Beam Bridge
On Concrete Column Bents

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

SH 279 @
HOLLOWAY CREEK
230250048004011
BROWN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		136

DATE: 8/18/2021 4:34:36 PM
FILE: T:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 279 HOLLOWAY CREEK.dgn

SOUTHEAST WINGWALL - LOOKING WEST VIEW 1776

NOTE: MODERATE SPALLING IN SOUTHEAST WINGWALL AT JUNCTION WITH SOUTH ABUTMENT BACKWALL.

PHOTO #1

WEST EXTERIOR BEAM - LOOKING SOUTHEAST VIEW 1772

NOTE: MODERATE TO ADVANCED SPALLS WITH EXPOSED CORRODED REBAR IN WEST EXTERIOR BEAM AND IN SOFFIT OF DECK.

PHOTO #2

INTERIOR BENT CAP - LOOKING SOUTH VIEW 1774

NOTE: MODERATE SPALLS WITH EXPOSED CORRODED REBAR IN DECK SOFFIT, AND ON FACE OF IN INTERIOR BENT CAP.

PHOTO #3

PHOTO #4

PHOTO #5

SH 279 @
HOLLOWAY CREEK
230250048004011
BROWN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		137

DATE: 8/18/2021 4:34:36 PM
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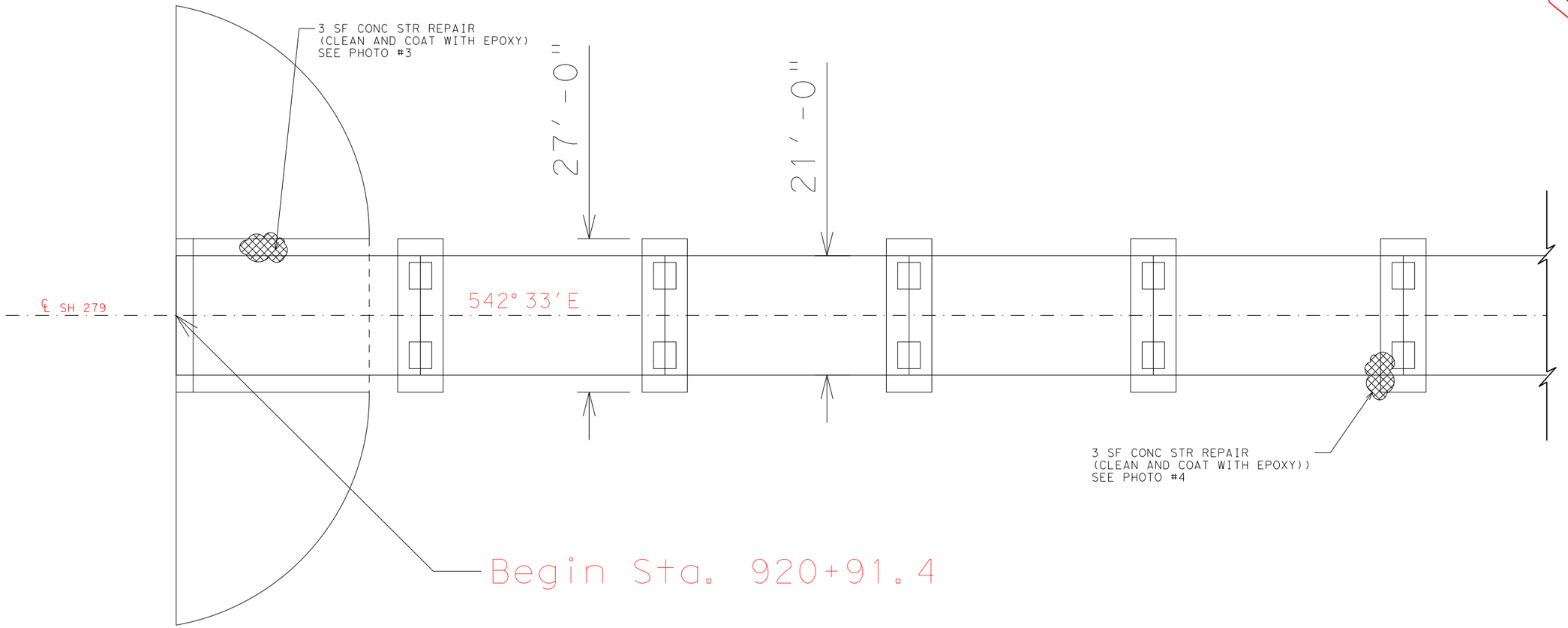

NOTE: ZEBRA MUSSELS ARE PRESENT AT THIS LOCATION.
REFER TO "ENVIRONMENTAL" SECTION OF THE GENERAL NOTES
FOR MITIGATION REQUIREMENTS.

Sta 920+91.4 - 934+22.7
13 Simple Span (10 reincforced Concrete T-Beam Widened
With Prestressed Concrete Beams,
1 Concrete Flat Slab, 2 Prestressed Concrete Beam Spans)
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	16	SF
784	6009	REP STL BRIDGE MEMBER (SHOES)	1	EA

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**SH 279 @
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2302548002002
BROWN CO.**

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		138

DATE: 8/31/2021 2:53:22 PM
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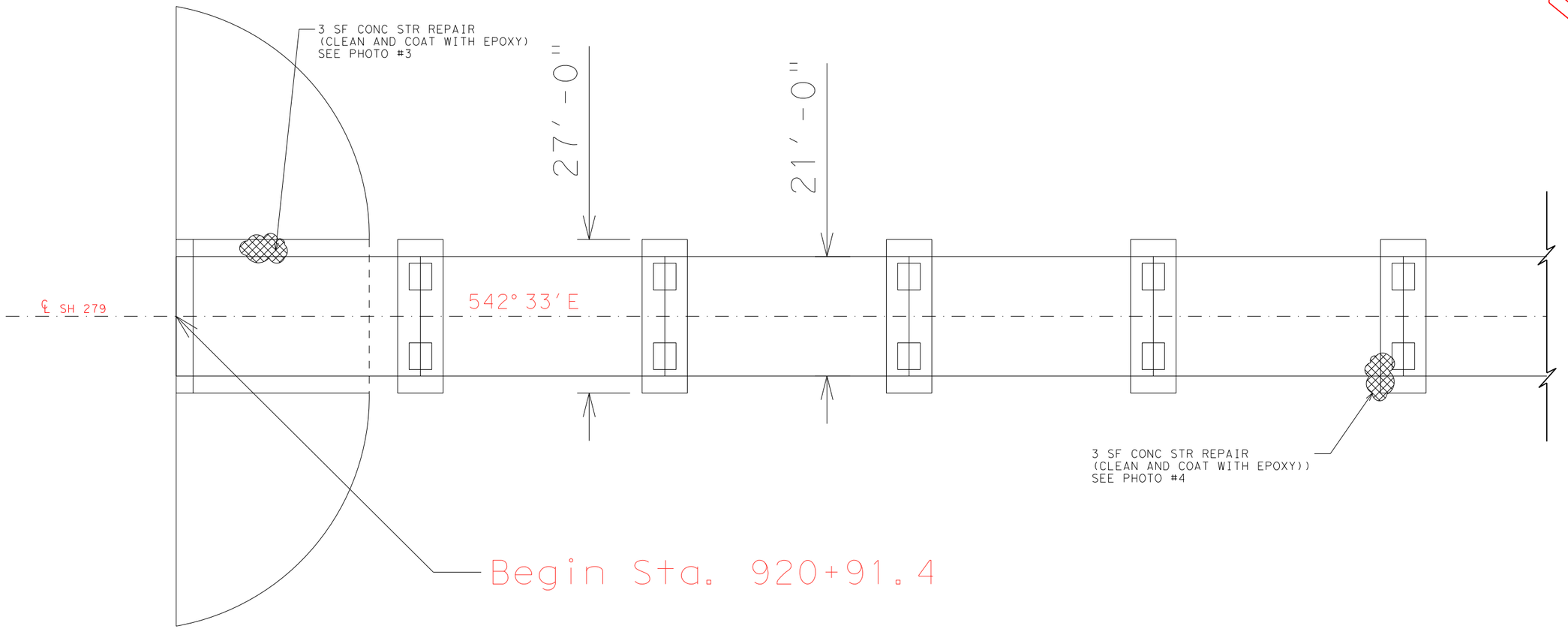

Sta 920+91.4 - 934+22.7
13 Simple Span (10 reincforced Concrete T-Beam Widened
With Prestressed Concrete Beams,
1 Concrete Flat Slab, 2 Prestressed Concrete Beam Spans)
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN AND COAT WITH EPOXY)	16	SF
784	6009	REP STL BRIDGE MEMBER (SHOES)	1	EA

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		139

DATE: 8/18/2021 4:34:40 PM
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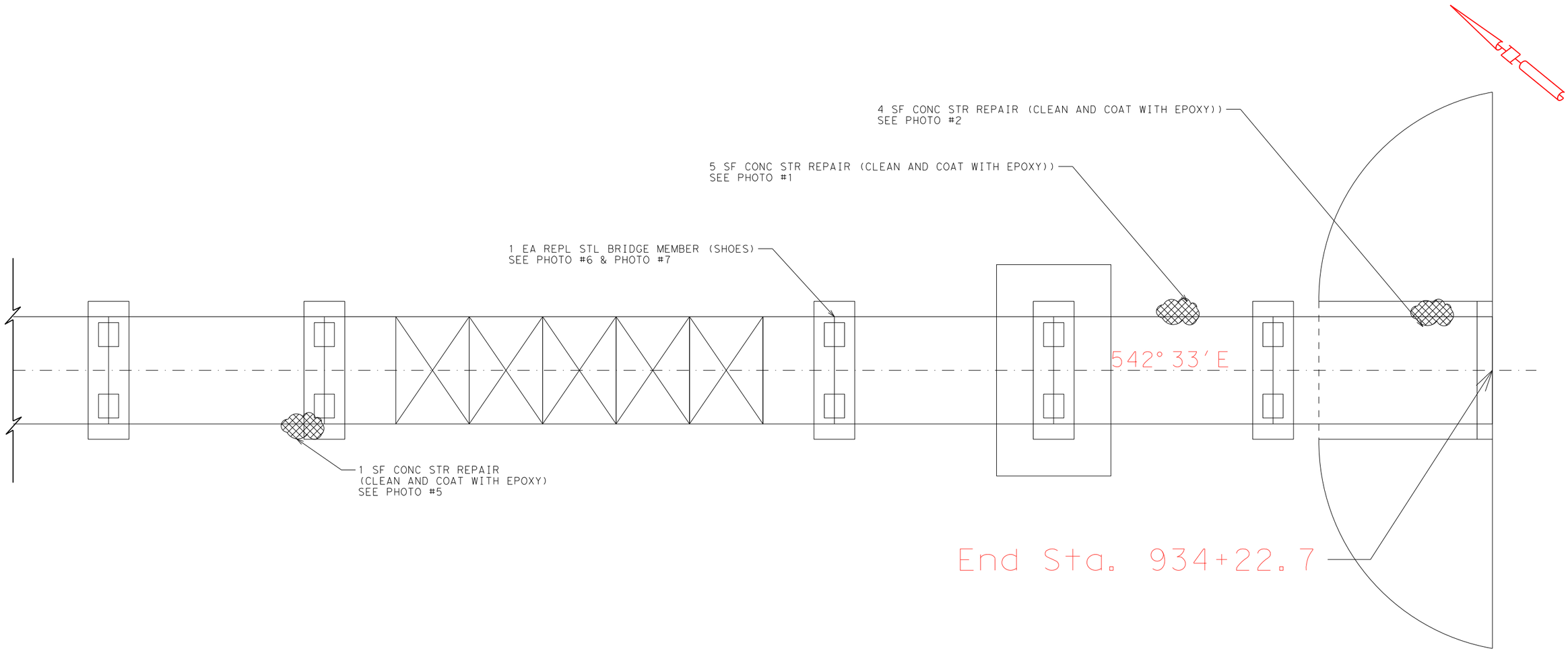

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08/19/2021

SH 279 @
LAKE BROWNWOOD
2302548002002
BROWN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		140

DATE: 8/18/2021 4:34:41 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 279 LAKE BROWNWOOD.dgn

NORTHWEST ABUTMENT CAP - LOOKING NORTHWEST VIEW 6963

NOTE: MODERATE TO ADVANCED CRACKS IN WESTERN PORTION OF NORTHWEST ABUTMENT CAP BETWEEN BEAMS 1 & 2 FROM SOUTH WEST.

PHOTO #1

SOUTHEAST ABUTMENT CAP - LOOKING NORTHEAST VIEW 6971

NOTE: DAMAGED SECTIONS OF SOUTHEAST ABUTMENT CAP HAVE BEEN REPAIRED.

UNDERMINING OF SOUTHEAST ABUTMENT CAP UP TO 8" DEEP AND 24" BACK.

PHOTO #2

DRILLED SHAFT - LOOKING NORTH VIEW 6966

NOTE: SCOUR HAS EXPOSED DRILLED SHAFT OF NORTHEAST EXTERIOR COLUMN OF BENT 2 FROM NORTHWEST UP TO 27" DEEP.

PHOTO #3

DATE: 8/18/2021 4:34:42 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\SH 279 ROCKY CREEK.dgn

SH 279 @
ROCKY CREEK
230250048001003
BROWN CO.

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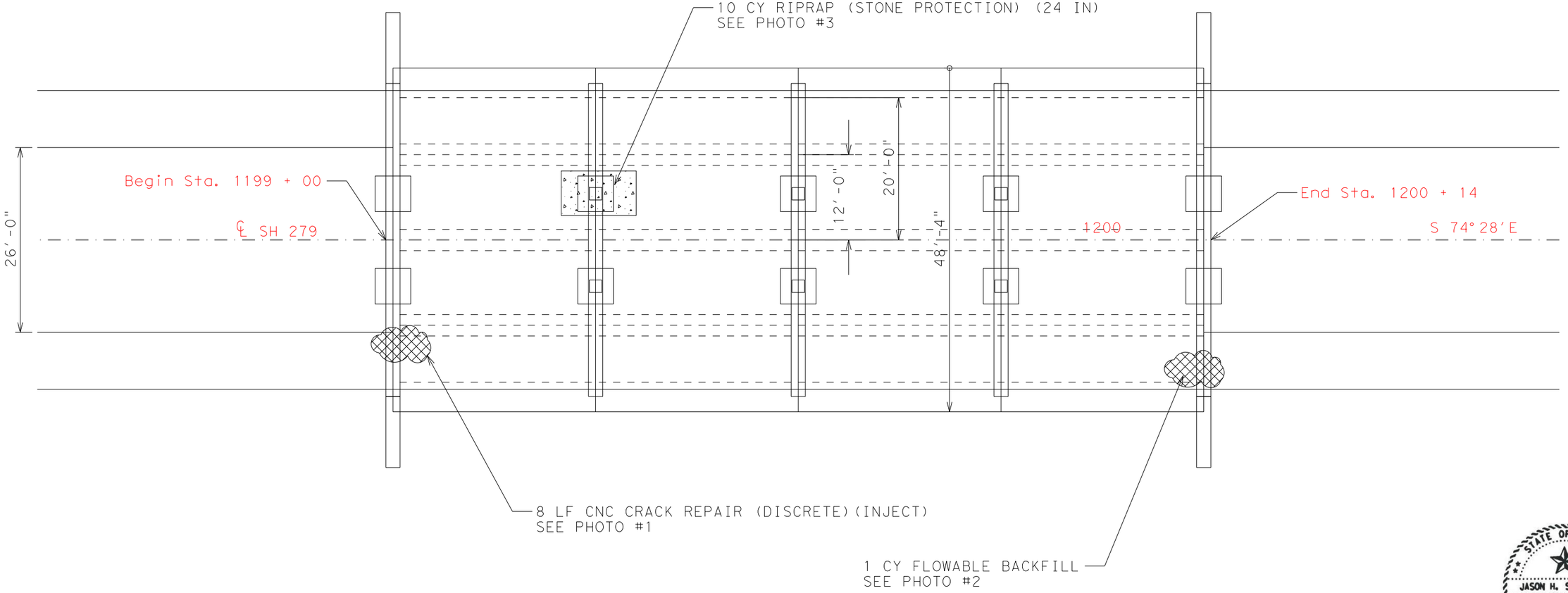
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		141



Sta 1199+00 - 1200+14
4 Simple Span Reinforced Concrete T-Bean Bridge
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	1	CY
432	6035	RIPRAP (STONE PROTECTION)(24 IN)	10	CY
780	6002	CNC CRACK REPAIR (DISCRETE) (INJECT)	8	LF

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SH 279 @
ROCKY CREEK
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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		142

DATE: 8/18/2021 4:34:43 PM
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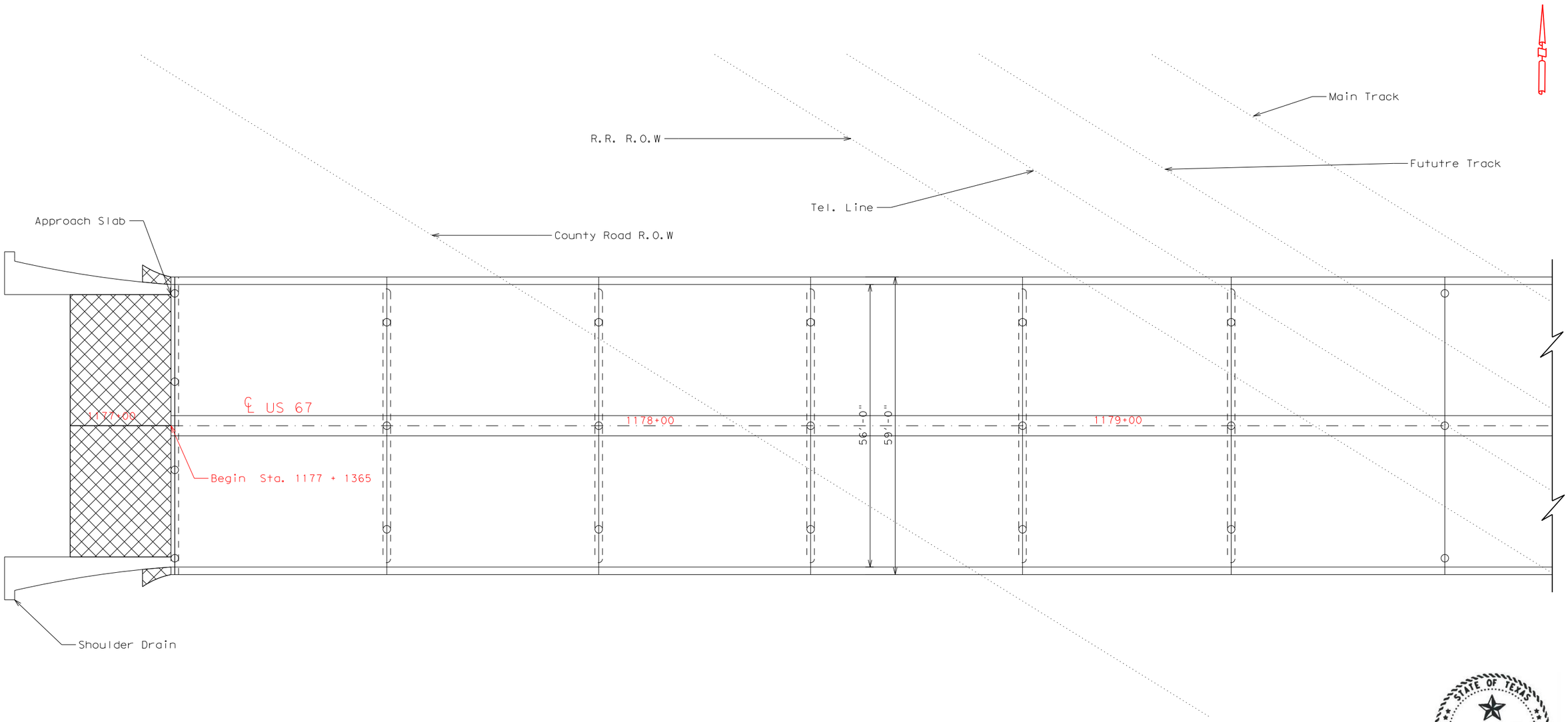

NOTE: BEAMS, DIAPHRAGMS, AND BEARINGS SHALL BE SPOT CLEANED AND PAINTED IN ACCORDANCE WITH ITEM 446 UP TO 200 SF.

NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

Sta. 1177+1365 - 1182+61.15
5 Span & 4 Span Continuous Steel Beam
Units 4 Simple Steel beams
On Steel and Concrete Bents
BNSF RR DOT # 021 216N

ITEM	CODE	DESCRIPTION	QUANT	UNIT
446	6028	SPOT CLEAN & PAINT EXIST STR (SPL PRT SYS)	1	LS
429	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	784	LF

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US 67 @ BSNF RR
230420007805036
COLEMAN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		143

DATE: 8/18/2021 4:34:44 PM
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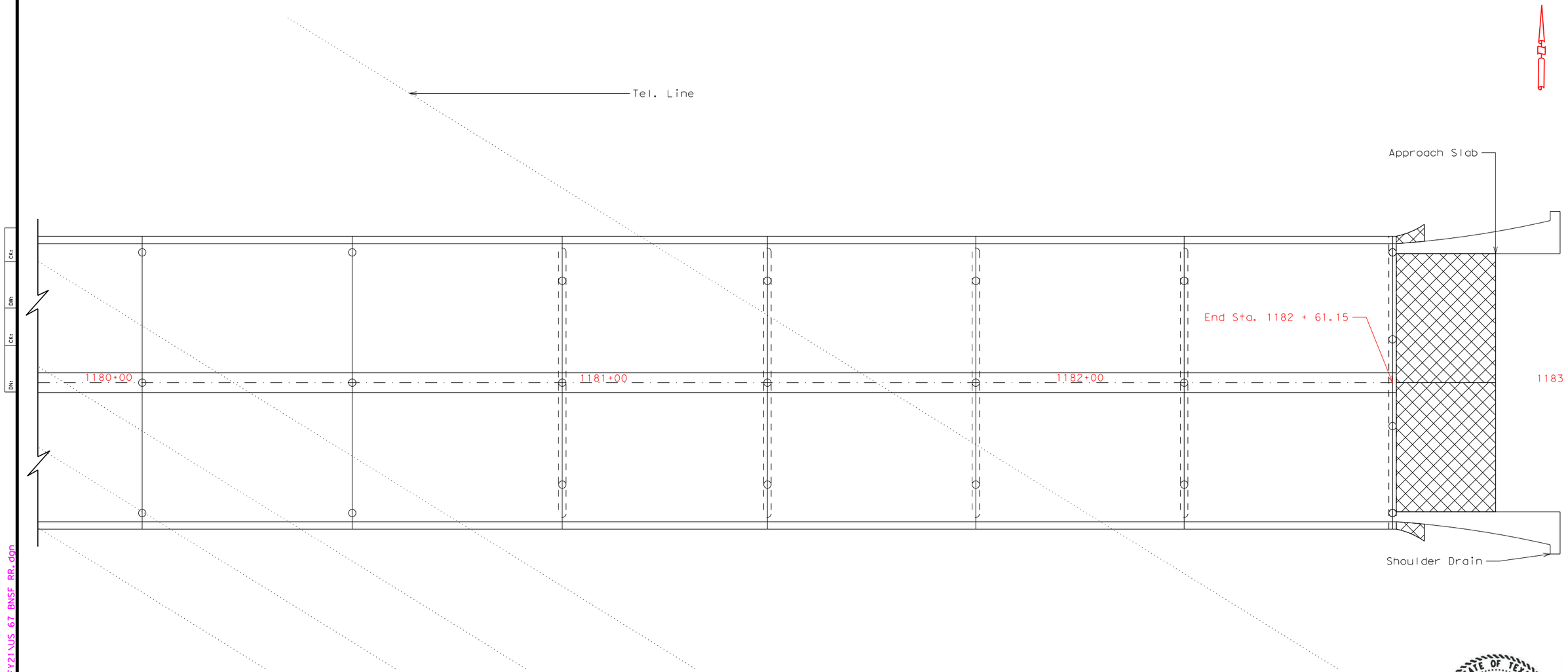

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08/19/2021

US 67 @
BSNF RR
230420007805036
COLEMAN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		144

DATE: 8/18/2021 4:34:44 PM
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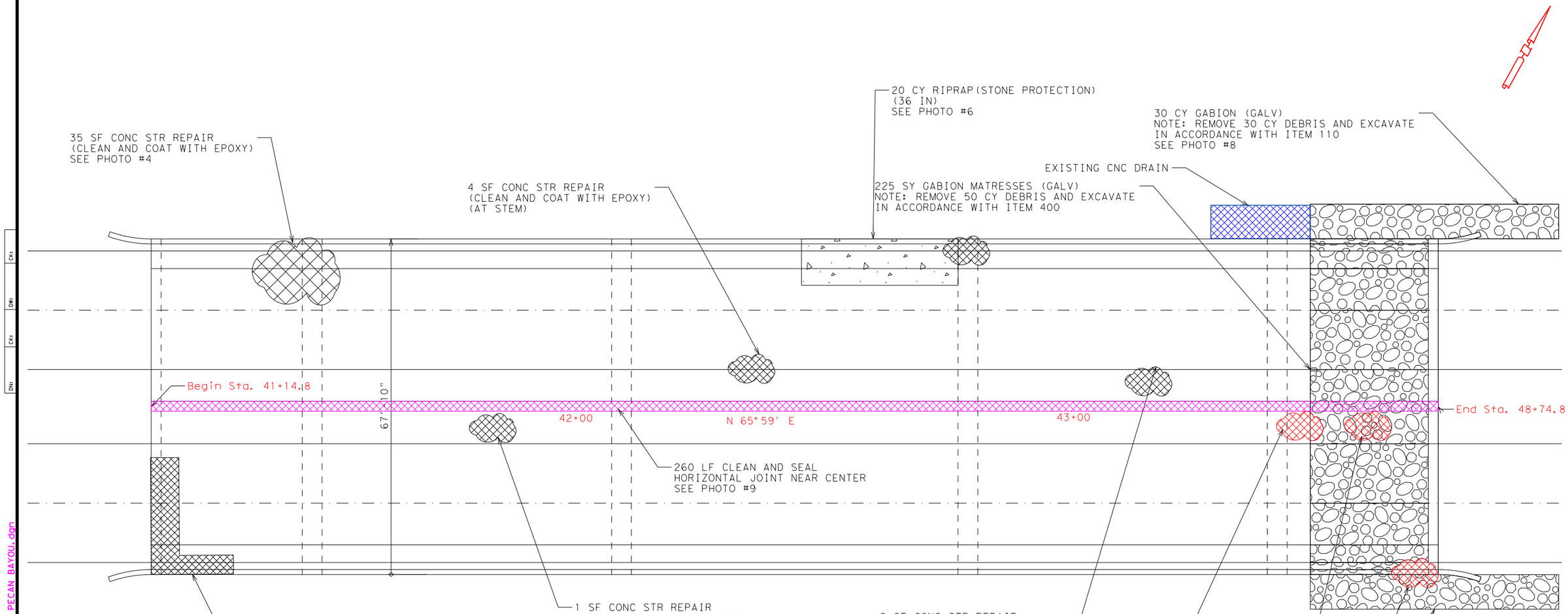

NOTE: DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" AND DETAIL "D" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

NOTE: ~125 SF OF SPALLS IN BRIDGE DECK SOFFIT ALONG ENTIRE CENTERLINE OF ROADWAY NEED TO BE REPAIRED IN ACCORDANCE WITH ITEM 429

Sta 41+14.8 - 48+74.8
3 Continuous & 4 Simple Span Variable Depth
Reinforced Concrete Beam Bridge
Widened With Steel, Reinforced Concrete
& Prestressed Concrete Beams
On Concrete Column Bents

ITEM	CODE	DESCRIPTION	QUANT	UNIT
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	532	LF
438	6004	CLEANING AND SEALING EXISTING JOINTS(CL7)	136	LF
432	6037	RIPRAP (STONE PROTECTION) (36 IN)	20	CY
459	6007	GABION MATTRESSES(GALV)(12IN)	225	SY
459	6001	GABIONS (GALV)	60	CY
780	6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	3	LF
110	6002	EXCAVATION(CHANNEL)	110	CY
429	6001	CONC STR REPAIR(CLEAN & COAT WITH EPOXY)	61	SF

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09/07/2021

US 67 @
PECAN BAYOU
23025005407030
BROWN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		145

DATE: 9/7/2021 11:58:43 AM
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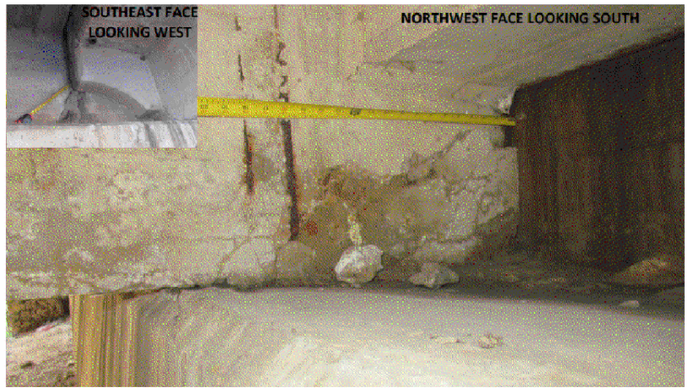


BEAM 8 - LOOKING SOUTH VIEW 6918 & 6912

NOTE: MODERATE SPALLS WITH EXPOSED REBAR & DELAMINATIONS AT END OF BEAM 8 FROM NORTHWEST OVER SOUTHWEST ABUTMENT CAP.

PHOTO #1

SOUTHWEST ABUTMENT CAP - LOOKING SOUTHWEST VIEW 6907

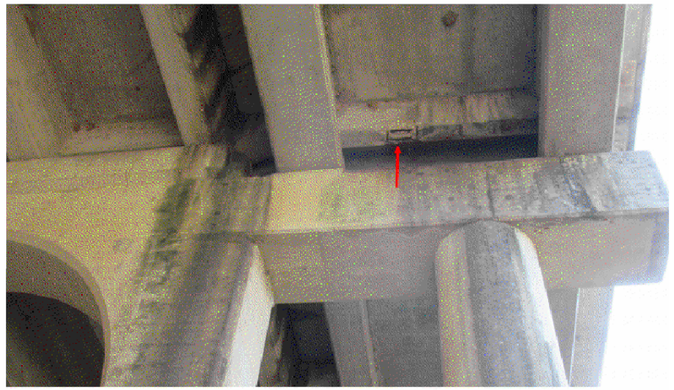
NOTE: MINOR HORIZONTAL CRACK NEAR TOP OF CAP. MODERATE SPALLS WITH EXPOSED REBAR IN SOUTHWEST ABUTMENT CAP. MODERATE SPALL WITH EXPOSED REBAR IN DECK SOFFIT OF SOUTHWEST SPAN.

PHOTO #2

EAST WINGWALL - LOOKING NORTH VIEW 6885

NOTE: MODERATE DELAMINATIONS AND SPALLS WITH EXPOSED REBAR IN EAST WINGWALL.

PHOTO #3



NORTHWEST DIAPHRAGM - LOOKING SOUTHWEST VIEW 6904

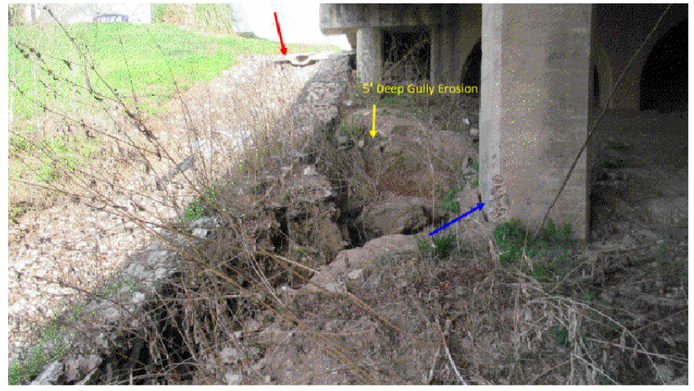
NOTE: NORTHWEST DIAPHRAGM OVER BENT 2 FROM SOUTHWEST HAS A MODERATE SPALL WITH EXPOSED REBAR.

PHOTO #4

NORTHEAST CHANNEL BANK - LOOKING NORTHEAST VIEW 6893

NOTE: MODERATE GULLY EROSION IN NORTHEAST CHANNEL BANK UNDER NORTHEAST SPAN.

PHOTO #5



NORTH CHANNEL BANK - LOOKING NORTHEAST VIEW 6895

NOTE: MODERATE TO ADVANCED EROSION ALONG NORTH GABION FLUME, UP TO 5 FT DEEP.
NORTH CONCRETE FLUME IS UNDERMINED. MODERATE TO ADVANCED HONEYCOMBING IN NORTH EXTERIOR COLUMN OF BENT 6.

PHOTO 6

PHOTO #7

PHOTO #8

PHOTO #9

US 67 @
PECAN BAYOU
23025005407030
BROWN CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		146

DATE: 8/18/2021 4:34:47 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 67 PECAN BAYOU.dgn

DN: CK: DW: CK:

ITEM	CODE	DESCRIPTION	QUANT	UNIT
480	6001	CLEAN EXIST CULVERTS	1	EA
110	6002	EXCAVATION (CHANNEL)	30	CY

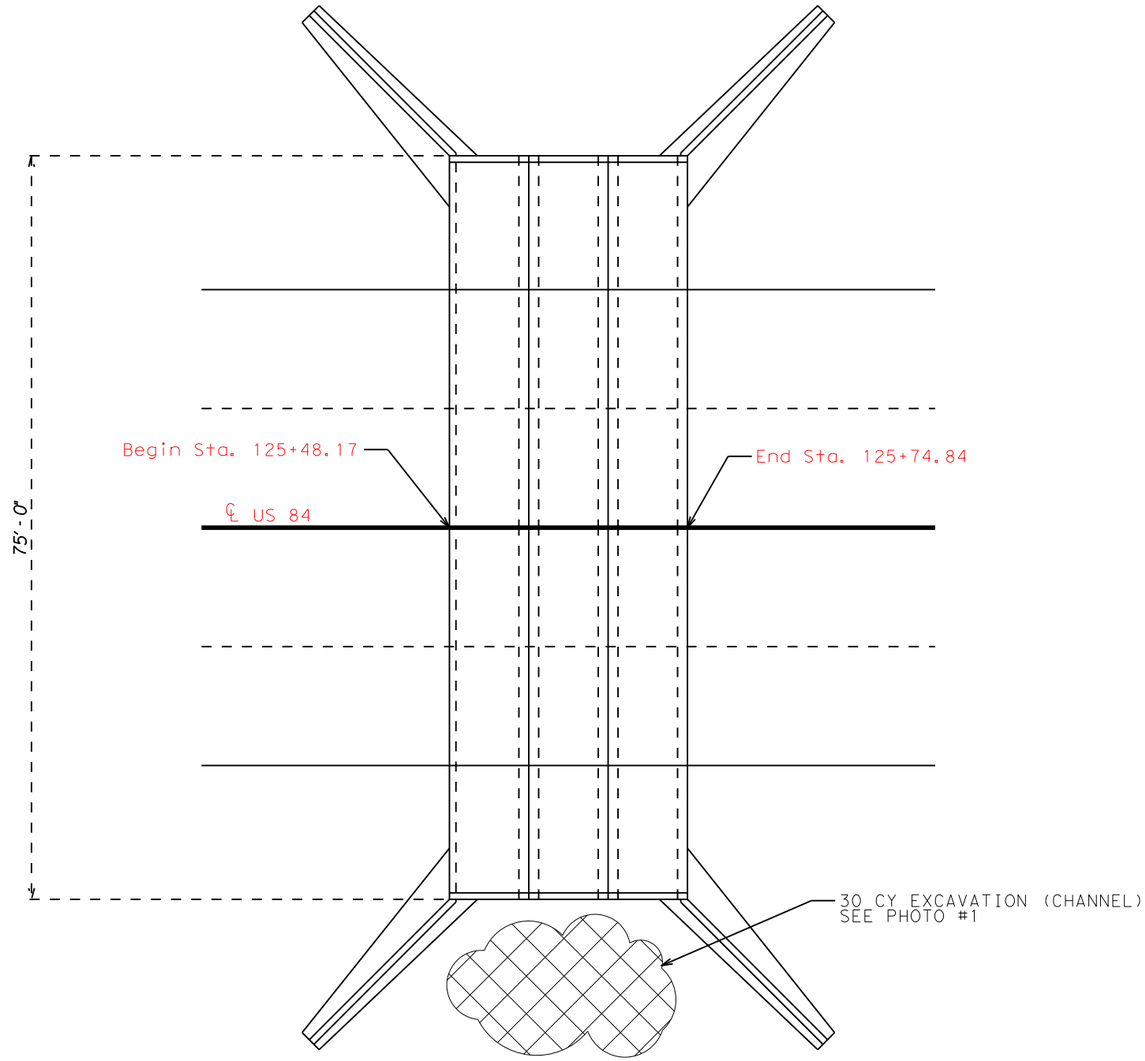
BUILDUP UPSTREAM SIDE

Looking SW

IMG. 0050

Note: Sediment buildup and thick vegetation in channel at upstream side.

PHOTO #1



Sta. 125+48.17 - 125+74.84
3 - 8' x 8'
Reinforced Concrete Box Culvert

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US 84 @
DRAINAGE DITCH
230420005402055
COLEMAN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		147

DATE: 8/18/2021 4:34:50 PM
FILE: ...\US 84 DRAINAGE DITCH.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
480	6001	CLEAN EXIST CULVERTS	1	EA
110	6002	EXCAVATION (CHANNEL)	25	CY

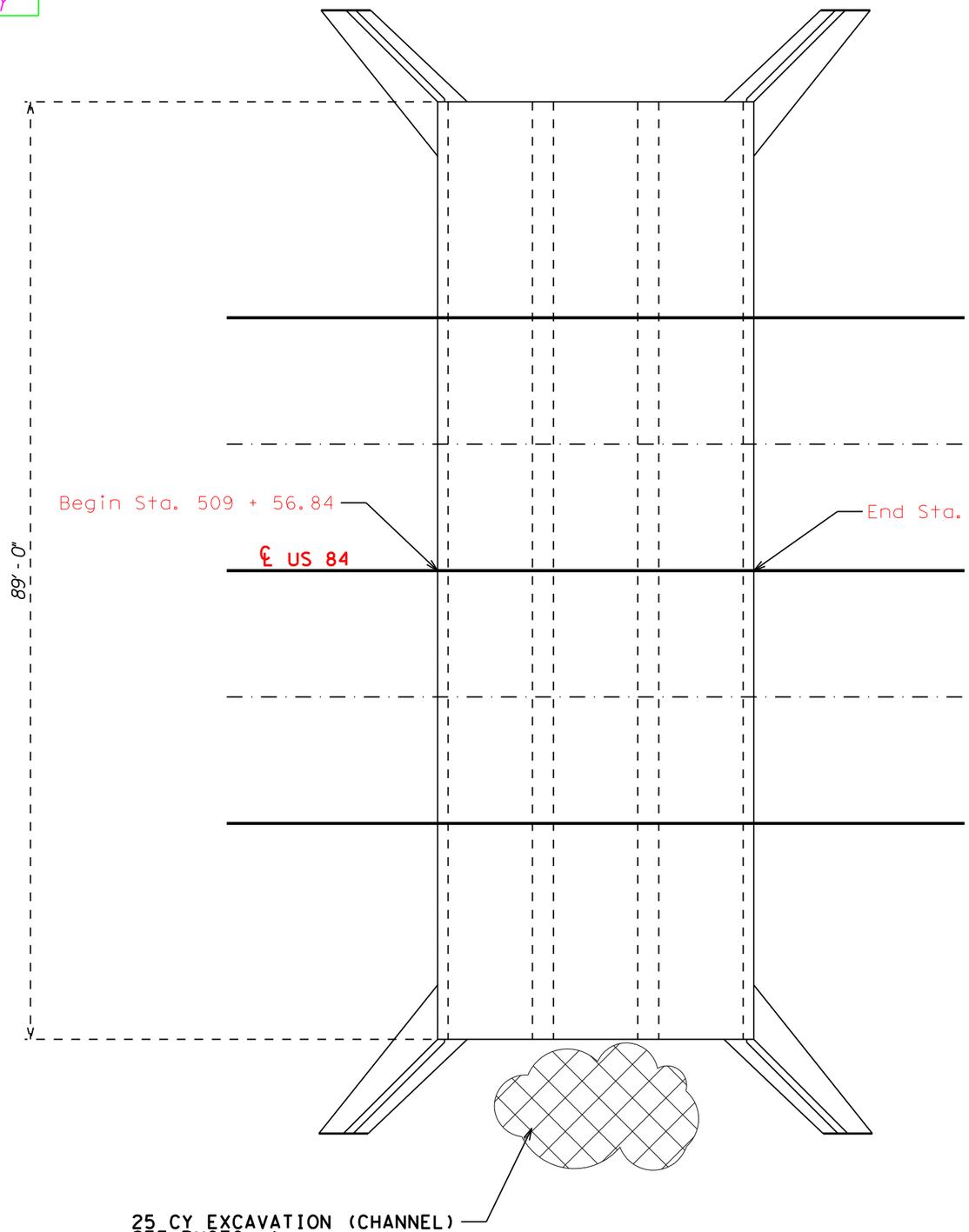
DATE: 15 JUL 2019
COUNTY: 042
CONT-SEC: 0054-04
STR: 018

STREAM VIEW
Looking NE

IMG. 0116

Note: Approximately 3' of sediment buildup in downstream channel.

PHOTO #1



Sta. 509+56.84 - 509+91.17
3 - 10' x 5'
Concrete Multiple Box Culvert

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US 84 @
DRAW
230420005404018
COLEMAN CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		148

DATE: 8/18/2021 4:34:51 PM
FILE: ...\US 84 DRAW.dgn

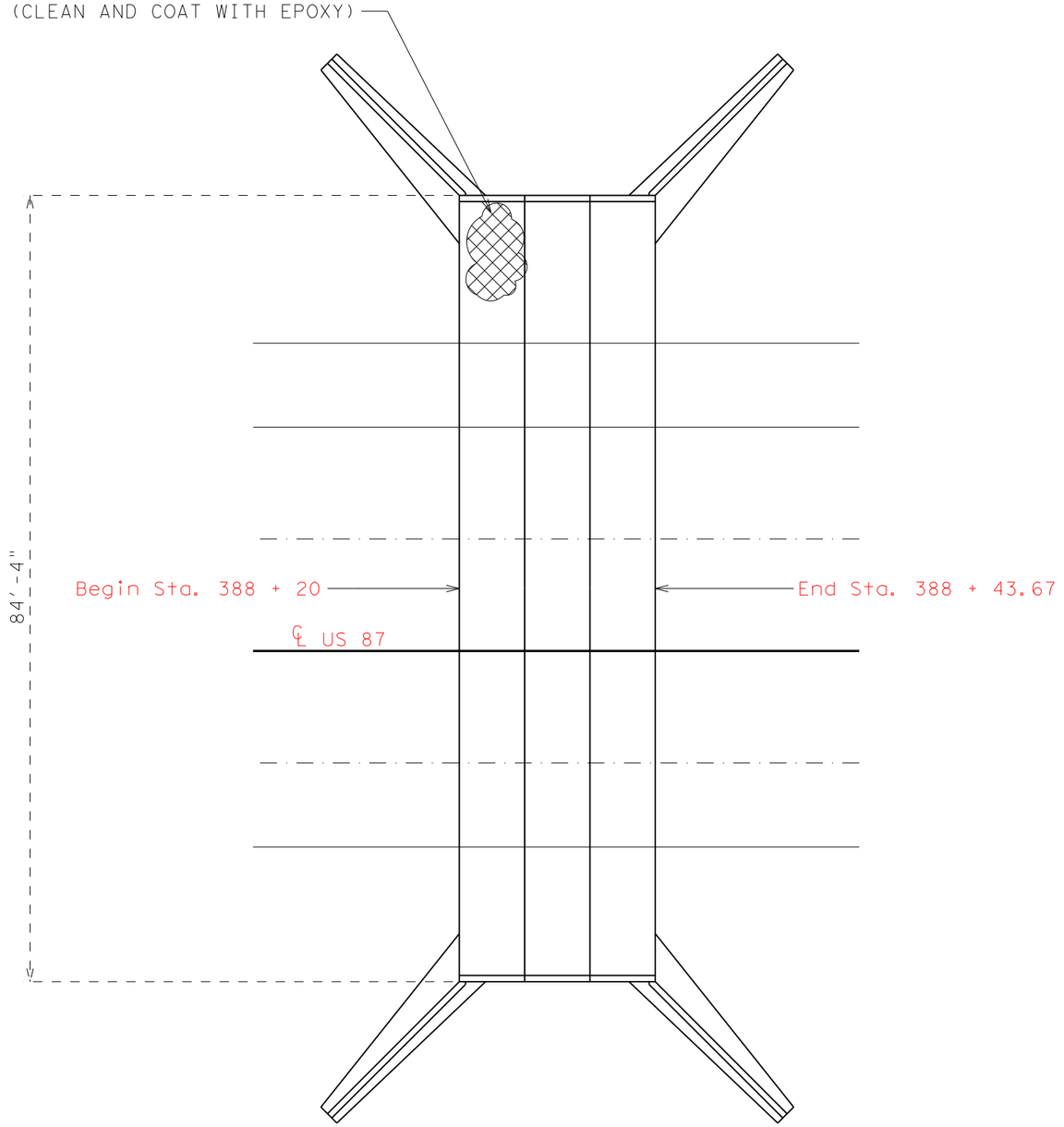
ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6001	CONC STR REPAIR (CLEAN & COAT WITH EPOXY)	12	SF

VIEW 7414

EAST BARREL - LOOKING NORTHEAST

NOTE: MODERATE INSUFFICIENT COVER SPALLS WITH EXPOSED CORRODED REBAR IN EAST BARREL SOFFIT AT SOUTH WIDENING JOINT.

PHOTO #1



Sta. 388+20 - 388+43.67
3 Barrel 7 x 6 Reinforced Concrete Box Culvert
With Cast In Place Concrete Wingwalls

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08/19/2021

US 87 @ DRAIN
231600007006036
MCCULLOCH CO.

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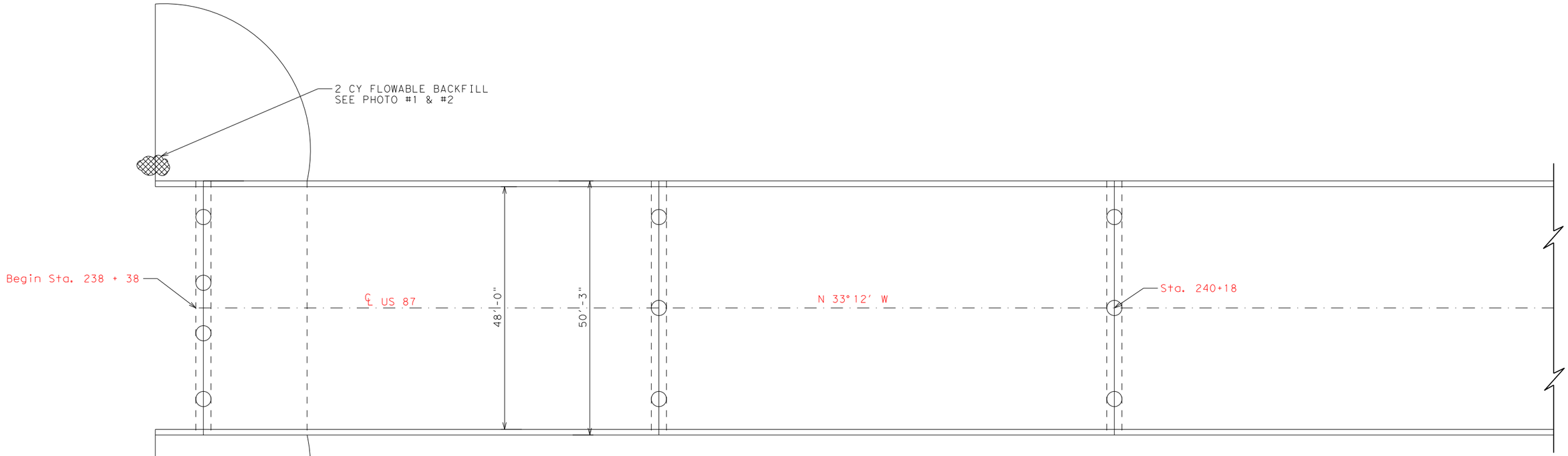
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		149

DATE: 8/18/2021 4:34:52 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 87 DRAIN.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	2	CY



Sta. 238+38 - 246+48
9 Simple Span Prestressed
Concrete I-Beam Bridge
On Concrete Column Bents

SOUTH EMBANKMENT - LOOKING SOUTHWEST VIEW 7483

NOTE: MODERATE EROSION SLOT 20" DEEP ALONG TOP EDGE OF SOUTH EMBANKMENT RIPRAP.

PHOTO #1

PHOTO #2

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08/19/2021

US 87 @
SAN SABA RIVER
231600071020 67
MCCULLOCH CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		150

DATE: 8/18/2021 4:34:56 PM
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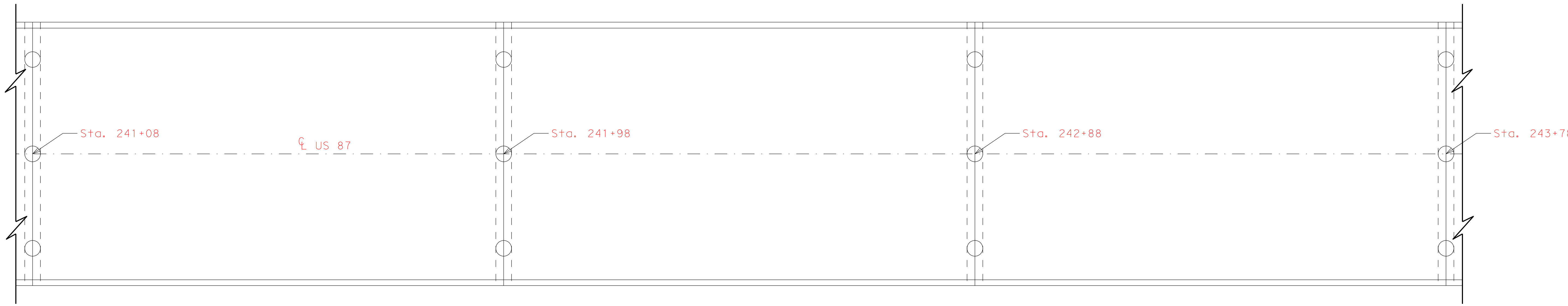

09/03/2021

US 87 @
SAN SABA RIVER
231600007102067
MCCULLOCH CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		151

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DATE: 8/31/2021 10:14:06 AM
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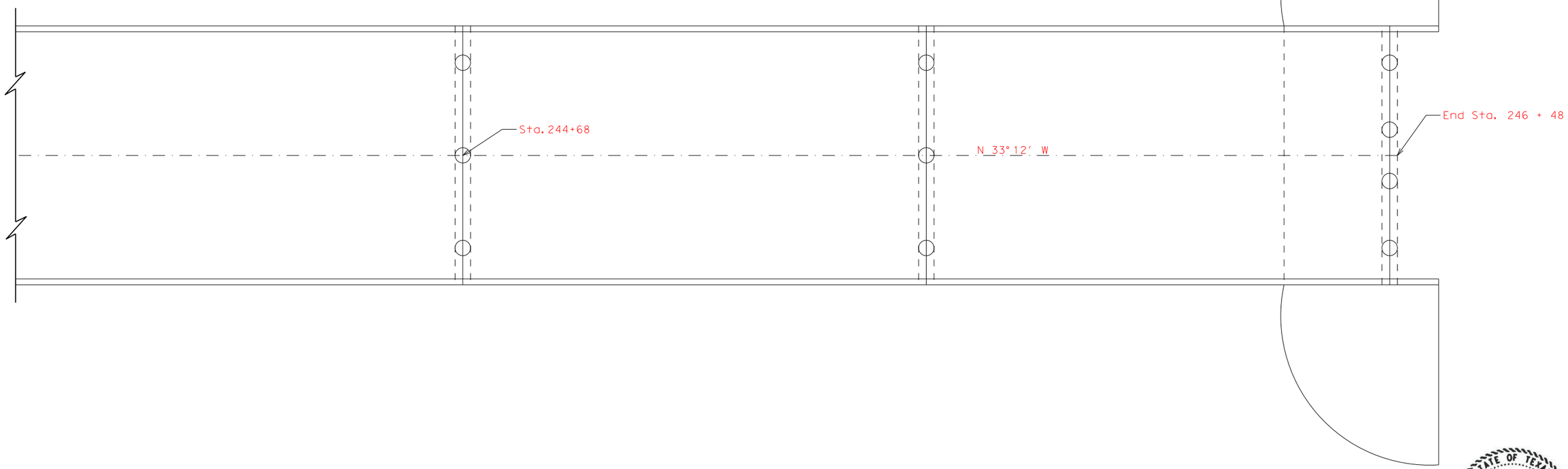

DATE: 8/18/2021 4:34:57 PM
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CK:
DW:
CK:
DN:

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96633
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08/19/2021

US 87 @ SAN SABA RIVER 231600007102067 MCCULLOCH CO.

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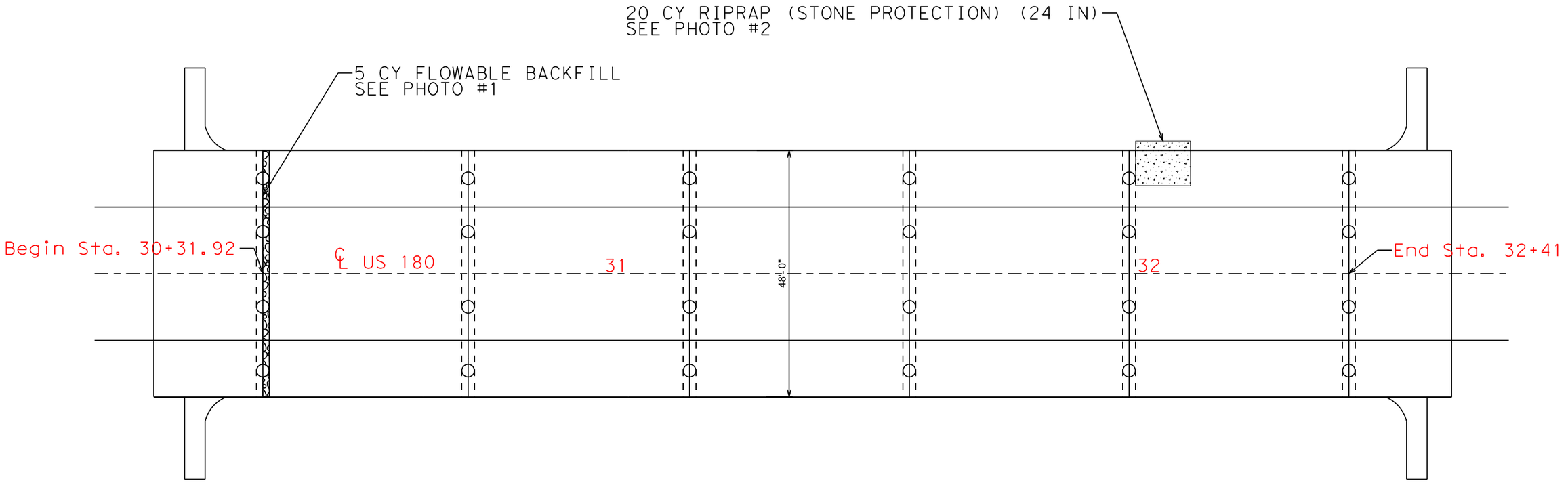
CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		152

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	20	CY
401	6001	FLOWABLE BACKFILL	5	CY



Sta. 30+31.92 + 32+41
5-span simple reinforced concrete pan girder bridge on concrete column bents

EROSION AT W ABUTMENT CAP
Looking W
IMG. 017

Note: Erosion causing undermining at West abutment cap.

PHOTO #1

EROSION AT N END OF BENT 5 TIE BEAM
Looking NW
IMG. 021

Note: Erosion and spalling at North end of bent 5 tie beam with rebar exposed.

PHOTO #2

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

US 180 @
HUBBARD CREEK RELIEF
232150001107027
STEPHENS CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		153

DATE: 8/18/2021 4:34:58 PM
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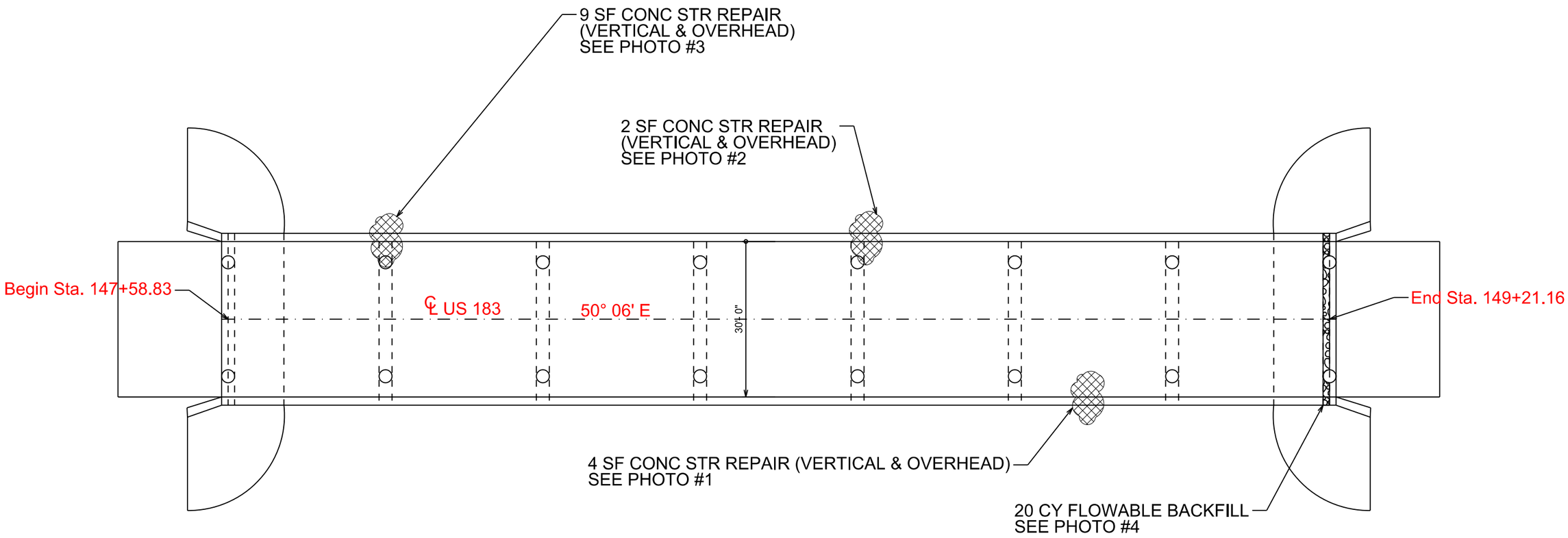

NOTE: REPAIR PAN GIRDER HOLES
USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE
WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED
AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS
WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL
BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES
FOR CONCRETE.

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	20	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	15	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	70	EA
427	6006	EPOXY WATERPROOF FINISH	280	SF

Sta. 147+58.83 - 149+21.16
7-Span Simple Reinforced Concrete Pan Girder
Bridge On Concrete Column Bents

STATE OF TEXAS
JASON H. SCANTLING
96633
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P.E.

09/03/2021

US 183 @
CLEAR FORK BRAZOS
RIVER RELIEF
232150040402024
STEPHENS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		154

DATE: 8/31/2021 2:24:55 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 183 CLEAR FORK BRAZOS RIVER RELIEF.dgn

DATE: 26 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 024

SPALL IN SPAN 6 GIRDER

Looking NW

IMG. 284

Note: Span 6 West girder has spall with rebar exposed.

PHOTO #1

SPALL AT EAST GIRDER OF SPAN 5

Looking W

IMG. 283

Note: Span 5 East girder has spall with rebar exposed at North end.

PHOTO #2

DATE: 26 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 024

SPALL AT BENT 2 CAP

Looking S

IMG. 280

Note: Bent cap 2 has spalls with rebar exposed.

PHOTO #3

UNDERMINING AT SOUTH ABUTMENT CAP

Looking SE

IMG. 285

Note: South abutment cap has undermining over the entire length.

PHOTO #4

US 183 @
CLEAR FORK BRAZOS
RIVER RELIEF
232150040402024
STEPHENS CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		155

DATE: 8/18/2021 4:35:00 PM
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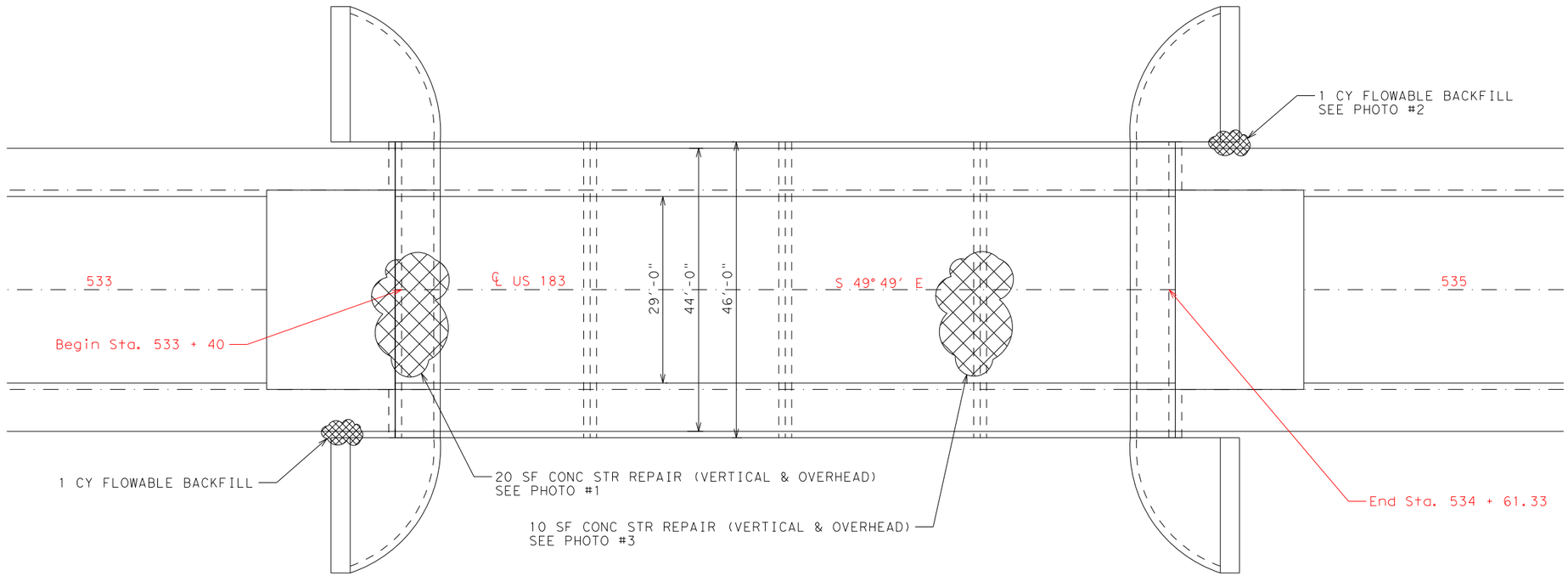

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	2	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	30	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	56	EA
427	6006	EPOXY WATERPROOF FINISH	160	SF

Sta. 533+40 - 534+61.33
4 Simple Span Reinforced Conc Pan Girder Bridge
On Conc Column Bents

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

09/03/2021

US 183 @ DRAW
232150040402017
STEPHENS CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		156

DATE: 8/31/2021 2:29:30 PM
FILE: T:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 183 DRAW.dgn

DN: | CK: | DW: | CK:

DATE: 27 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 017

SPALL AT NW ABUTMENT CAP

Looking NW

IMG. 360

Note: Northwest abutment cap has a large spall with exposed rebar over a 10' length.

PHOTO #1

EMBANKMENT EROSION AT WEST AND EAST CORNERS

Looking N

IMG. 354

Note: Embankment erosion has undermined top of rip rap up to 1' at West corner and East corner with a small void.

PHOTO #2

DATE: 27 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 017

SPALL AT BENT 4

Looking NW

IMG. 359

Note: Spalls with rebar exposed in the end diaphragms at bent 4 (Typical in all spans).

PHOTO #3

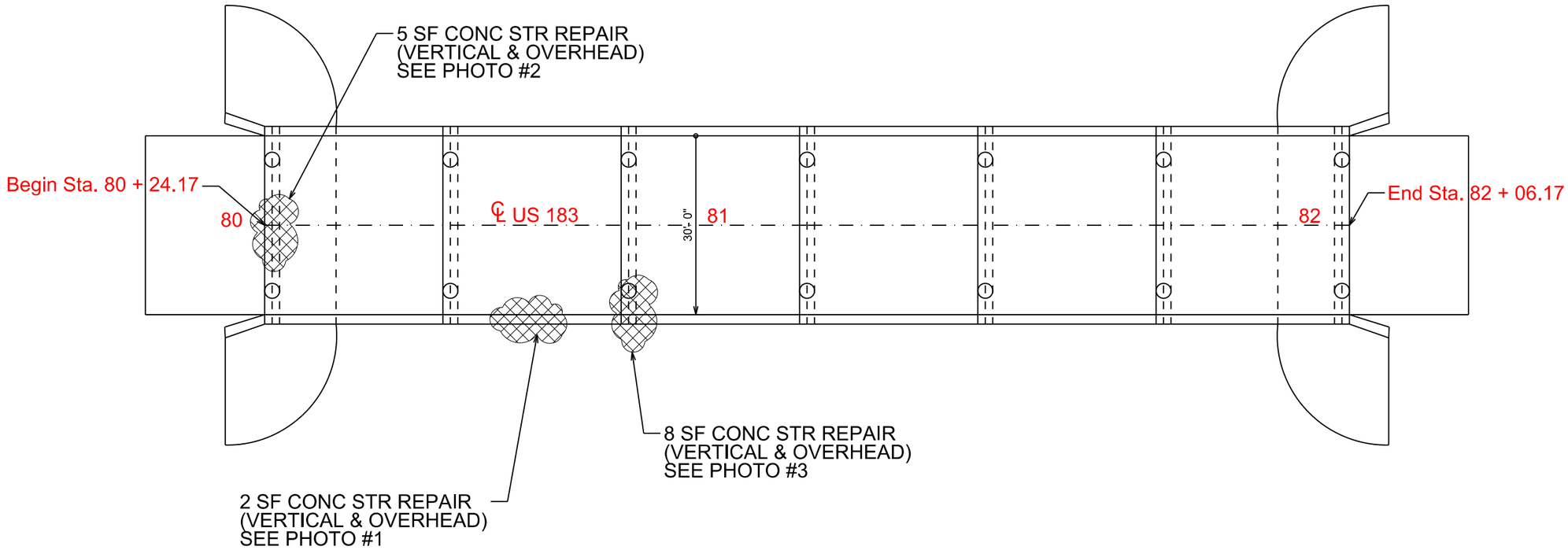
CK:
DW:
CK:
DN:

DATE: 8/18/2021 4:35:03 PM
FILE: T:\BWD\DSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 183 DRAW.dgn

US 183 @
DRAW
232150040402017
STEPHENS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		157



NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	15	SF
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	60	EA
427	6006	EPOXY WATERPROOF FINISH	240	SF

Sta. 80+24.17 - 82+06.17
6-Span Simple Reinforced Concrete Pan Girder
Bridge On Concrete Column Bents

STATE OF TEXAS
JASON H. SCANTLING
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09/03/2021

US 183 @
GIVENS CREEK
232150040402022
STEPHENS CO.

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CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		158

DATE: 8/31/2021 2:33:49 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 183 GIVENS CREEK.dgn

DATE: 26 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 022

SPALL IN WEST EXTERIOR GIRDER AT SPAN 2

Looking E

IMG. 259

Note: West exterior girder at span 2 has spall with rebar exposed.

PHOTO #1

SPALLS AT NORTH ABUTMENT CAP

Looking N

IMG. 256

Note: Spalls at North abutment cap have delamination and spalls with rebar exposed.

PHOTO #2

DATE: 26 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 022

SPALL AT WEST END OF BENT 3

Looking S

IMG. 258

Note: Bent 3 has delamination and spalls with rebar exposed on the West end.

PHOTO #3

DATE: 8/18/2021 4:35:05 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 183 GIVENS CREEK.dgn

US 183 @
GIVENS CREEK
232150040402022
STEPHENS CO.

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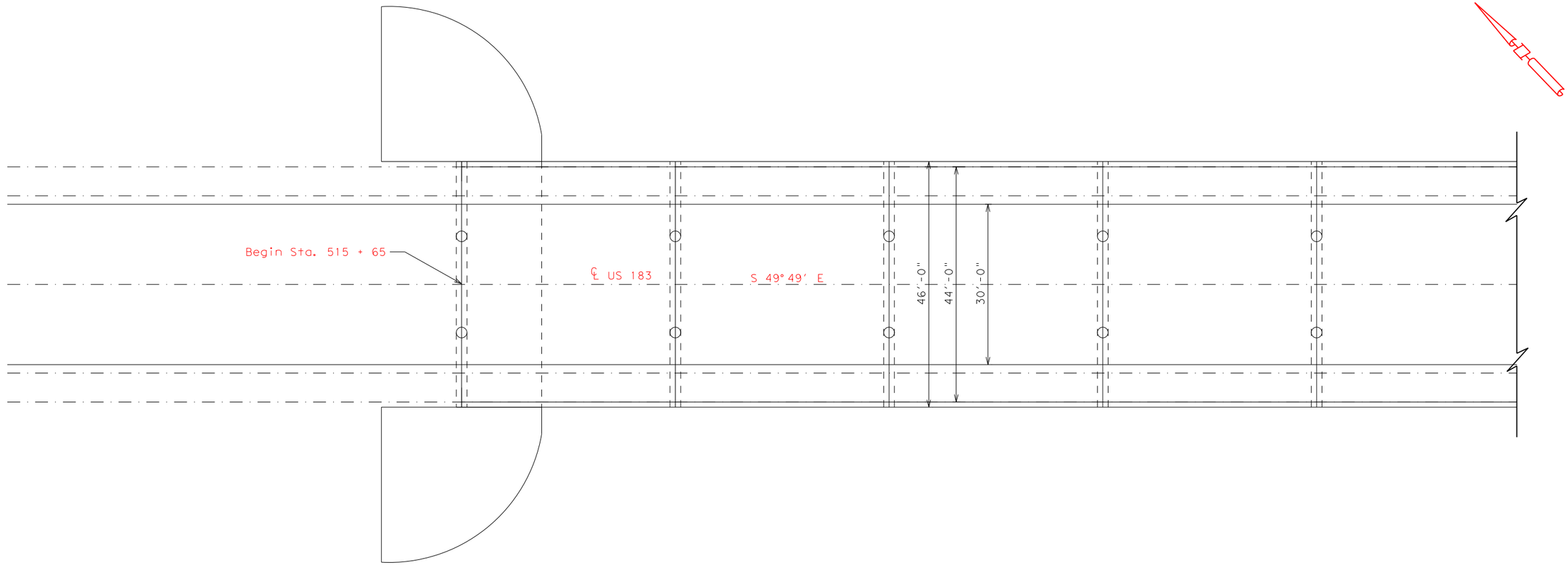
CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		159

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	1	CY
429	6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	4	SF
446	6028	SPOT CLEAN & PAINT EXIST STR (SPL PRT SYS)	1	LS
429	6023	CONC STR REPAIR (PAN GIRDER HOLE REPR)	70	EA
427	6006	EPOXY WATERPROOF FINISH	320	SF



NOTE: BEARINGS SHALL BE SPOT CLEANED AND PAINTED IN ACCORDANCE WITH ITEM 446 UP TO 100 SF

NOTE: REPAIR PAN GIRDER HOLES USING PAN GIRDER REPAIR DETAILS IN ACCORDANCE WITH ITEM 429.

EXTERIOR GIRDERS SHALL BE CLEANED, PREPARED, AND FINISHED AT ALL EXTERIOR DRAIN HOLES AS DIRECTED BY THE ENGINEER. THIS WORK IS ESTIMATED AT 10 SF PER EXTERIOR DRAIN HOLE, AND SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 427, SURFACE FINISHES FOR CONCRETE.

Sta. 515+65 - 519+60
3 Continuous Steel I - Beams
& 5 Simple Span Reinforced
Concrete Pan Girder Bridge
On Concrete Column Bents

SPALL AT BENT 6 CAP

Looking NW

IMG. 317

Note: Cap at bent 6 from NW has minor horizontal cracks along top edge and minor to moderate delaminations and spalls (up to 27"x18") with exposed rebar at underside.

PHOTO #1

DATE: 26 SEPT 2019
COUNTY: 215
CONT-SEC: 0404-02
STR: 015

EROSION HOLE AT SE END OF BRIDGE

Looking E

IMG. 310

Note: Erosion hole approximately 3" in diameter and 4' from white stripe of Southbound lane and depth greater than 4' on SE end of bridge.

PHOTO #2

STATE OF TEXAS
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09/03/2021

US 183 @
HUBBARD CREEK
232150040402015
STEPHENS CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		160

DATE: 8/31/2021 2:40:39 PM
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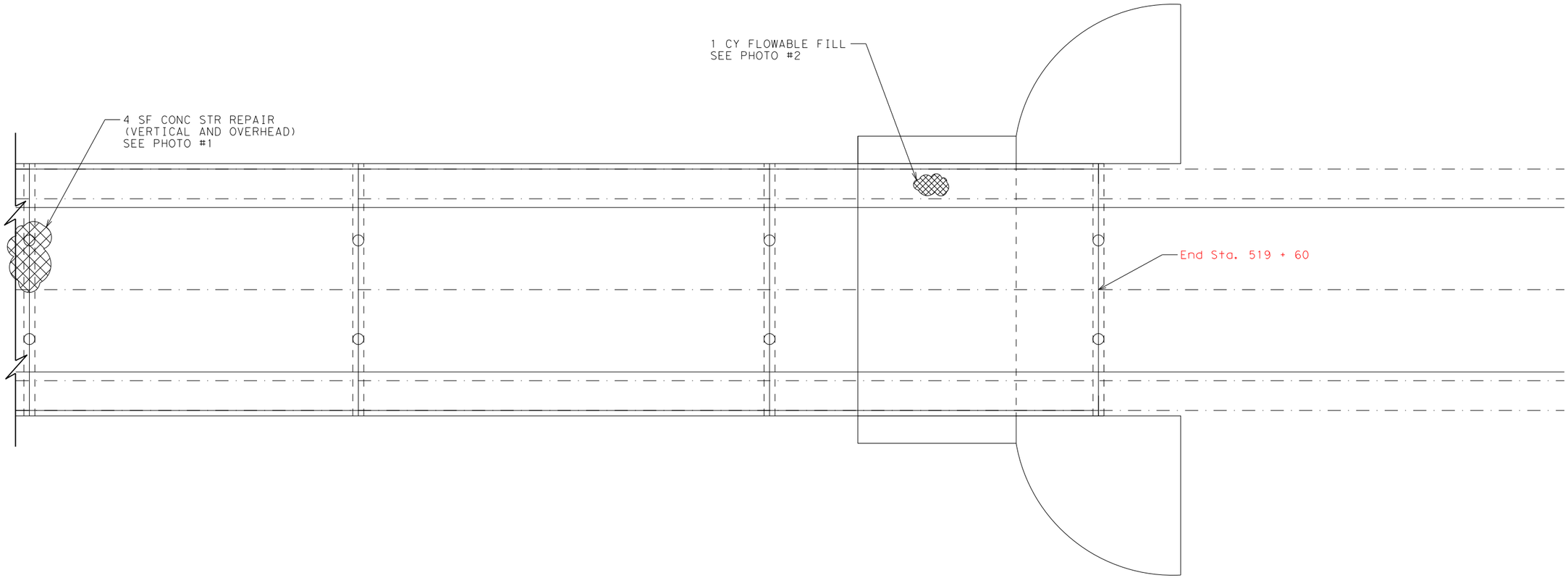

CK:
DW:
CK:
DN:

DATE: 8/18/2021 4:35:08 PM
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenonce Contract FY21\US 183 HUBBARD CREEK.dgn

STATE OF TEXAS
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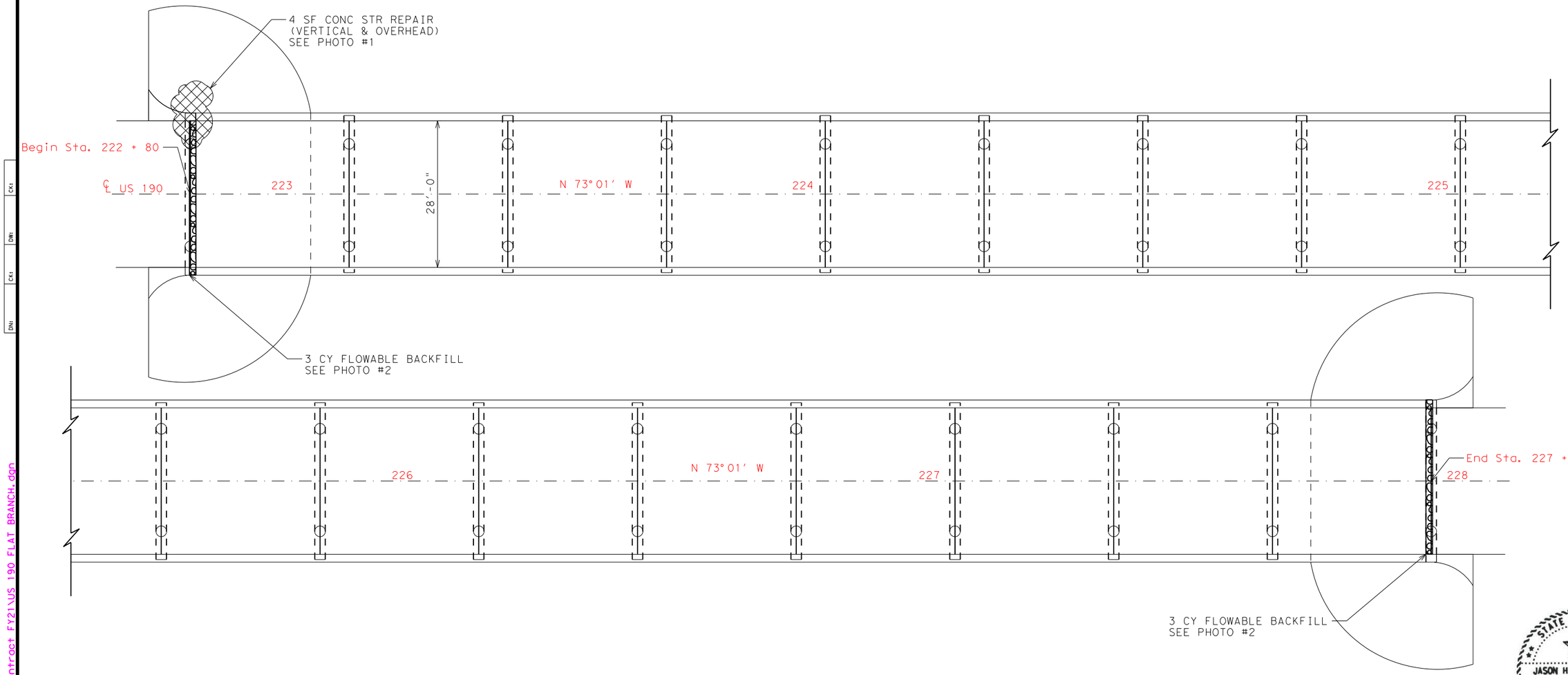
JHS, P.E.

08/19/2021

US 183 @ HUBBARD CREEK
232150040402015
STEPHENS CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		161

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	6	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	4	SF



Sta. 222+80 - 227+95.67
17 Simple Span Concrete Pan Girder Bridge

FRACTURE IN SE CORNER OF WINGWALL

Looking E

IMG. 114

Note: SE wingwall has an up to 4" wide fracture at the abutment connection with the top of the wingwall leaning outwards up to 2".

PHOTO #1

W ABUTMENT
RIPRAP SETTLEMENT

Looking S

IMG. 119

Note: Riprap at abutments has up to 3" of settlement and pulled away from caps approx. 2".

PHOTO #2

DATE: 22 OCT 2019
COUNTY: 206
CONT-SEC: 0272-03
STR: 055

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

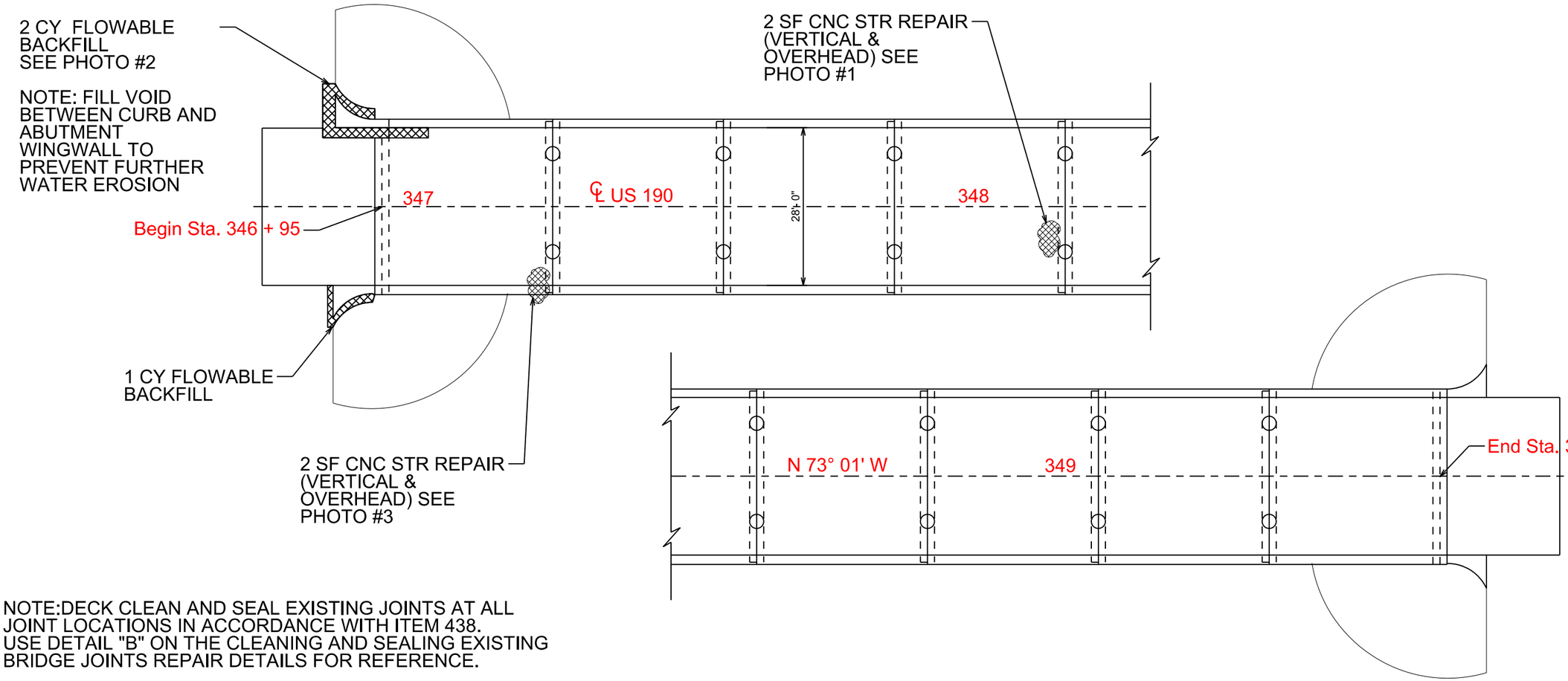
US 190 @
FLAT BRANCH
232060027203055
SAN SABA CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		162

DATE: 8/19/2021 11:04:50 AM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 190 FLAT BRANCH.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
401	6001	FLOWABLE BACKFILL	3	CY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	4	SF
438	6002	CLEANING AND SEALING EXISTING JOINTS(CL3)	280	LF



NOTE:DECK CLEAN AND SEAL EXISTING JOINTS AT ALL JOINT LOCATIONS IN ACCORDANCE WITH ITEM 438. USE DETAIL "B" ON THE CLEANING AND SEALING EXISTING BRIDGE JOINTS REPAIR DETAILS FOR REFERENCE.

PHOTO #1

PHOTO #2

PHOTO #3

Sta. 346+95 - 349+68
9-Span Simple Concrete Pan Girder Bridge

STATE OF TEXAS
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08/19/2021

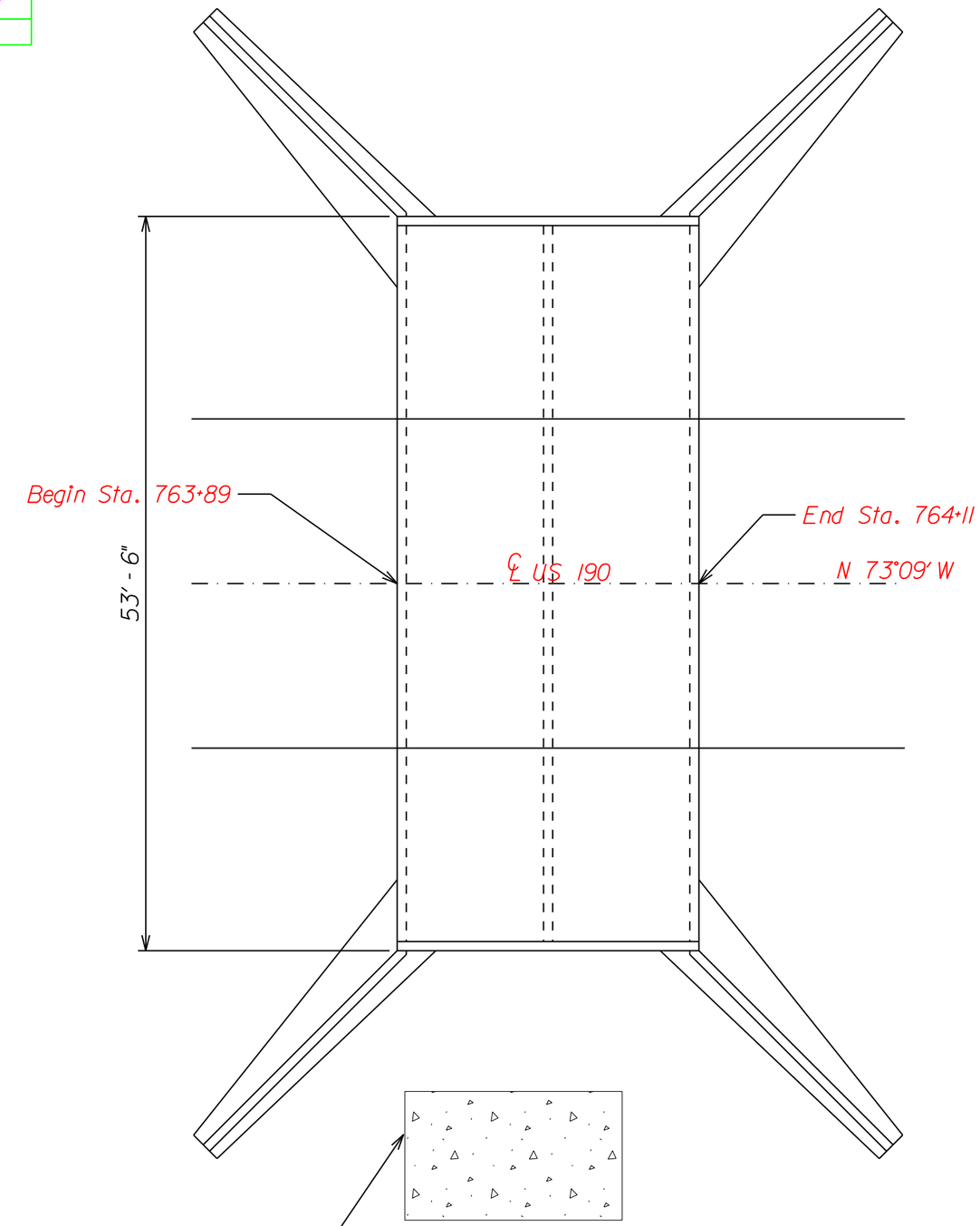
US 190 @
HARKEY SLOUGH
232060027203052
SAN SABA CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		163

DATE: 8/18/2021 4:35:16 PM
FILE: T:\BWDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\US 190 HARKEY SLOUGH.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
432	6037	RIPRAP (STONE PROTECTION)(36 IN)	20	CY



SCOUR AT
DOWNSTREAM END

Looking S

IMG. 025

Note: Channel bed scour has resulted in erosion of 3' to 4' below the downstream concrete riprap apron.

PHOTO #1

20 CY RIPRAP (STONE PROTECTION)(36 IN)
SEE PHOTO #1

Sta. 763+89 - 764+11
2 - 10' x 10' x 53.5'
Concrete Multiple Box Culvert

STATE OF TEXAS
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PROFESSIONAL ENGINEER

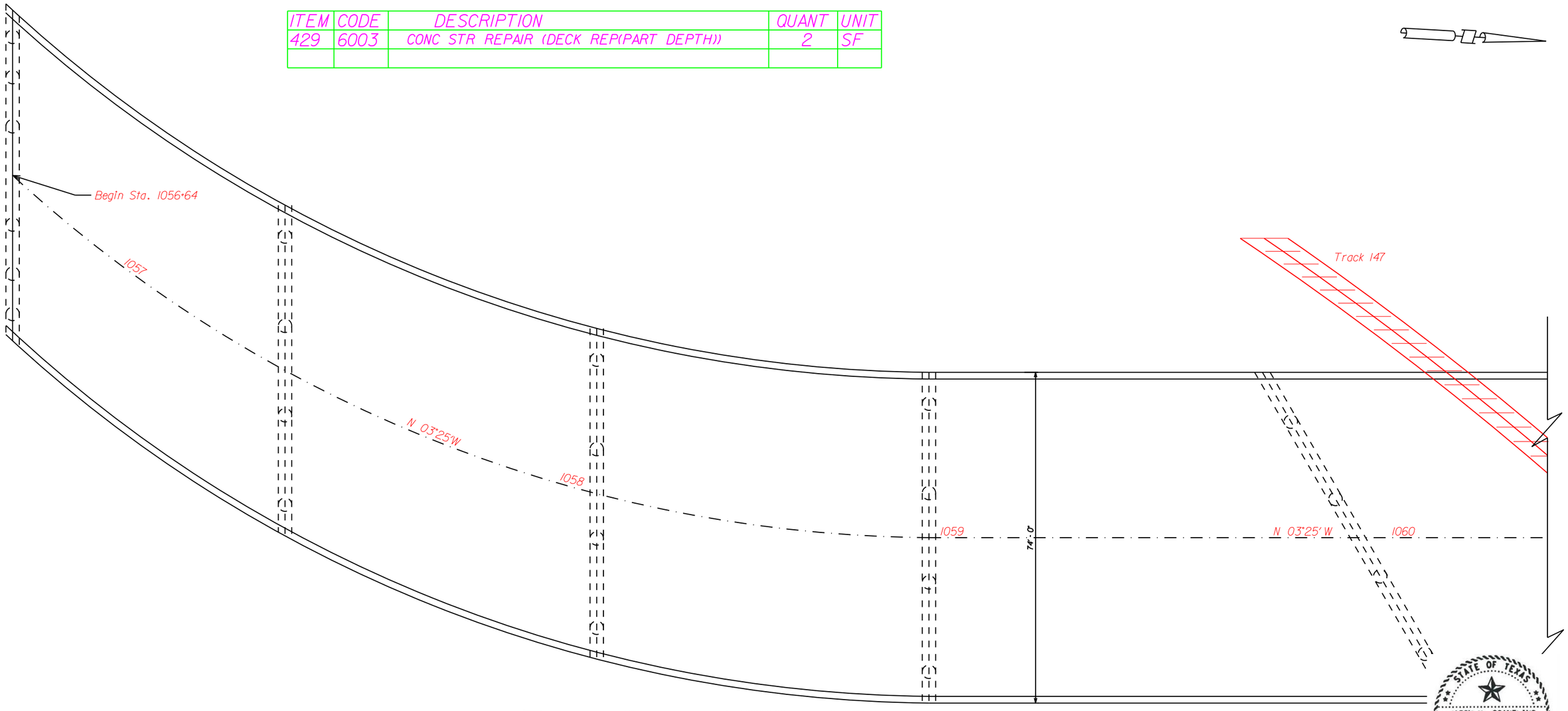
08/19/2021

US 190 @
HOOTEN HOLLOW
232060027203050
SAN SABA CO.

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		164

DATE: 8/18/2021 4:35:18 PM
FILE: ...\US 190 HOOTEN HOLLOW.dgn

ITEM	CODE	DESCRIPTION	QUANT	UNIT
429	6003	CONC STR REPAIR (DECK REP(PART DEPTH))	2	SF



Sta. 1056+64 - 1067+24.50
13 Simple Span Prestressed
Concrete I-Beam Bridge
On Concrete Column Bents

SPAN 5 DECK - LOOKING SOUTHWEST VIEW 2094

NOTE: MODERATE SPALLS WITH EXPOSED REBAR IN DECK SURFACE OF NORTHBOUND LANES OF SPAN 5 FROM SOUTH.

PHOTO #1

STATE OF TEXAS
JASON H. SCANTLING
96633
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PROFESSIONAL ENGINEER

JHS, P.E.

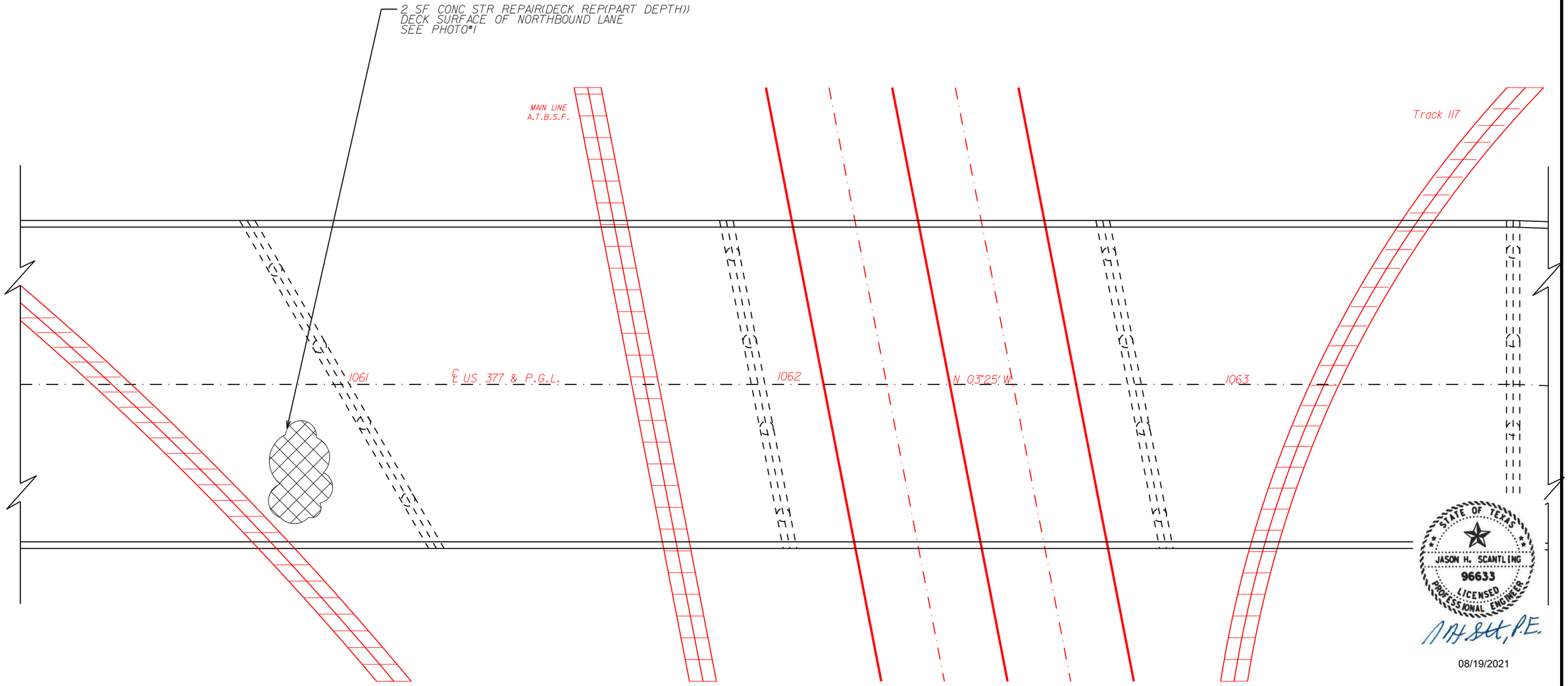
08/19/2021

US 377 @
BNSF RR & CARNEGIE ST
230250012801034
BROWN CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		165

DATE: 8/19/2021 11:07:35 AM
FILE: ...\US 377 BNSF RR & CARNEGIE ST.dgn



Sta. 1056+64 - 1067+80
13 Simple Span Prestressed Concrete I-Beam Bridge
On Concrete Column Bents

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

US 377 @
BNSF RR & CARNEGIE ST
230250012801034
BROWN CO.

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		166

DATE: 8/19/2021 11:08:44 AM
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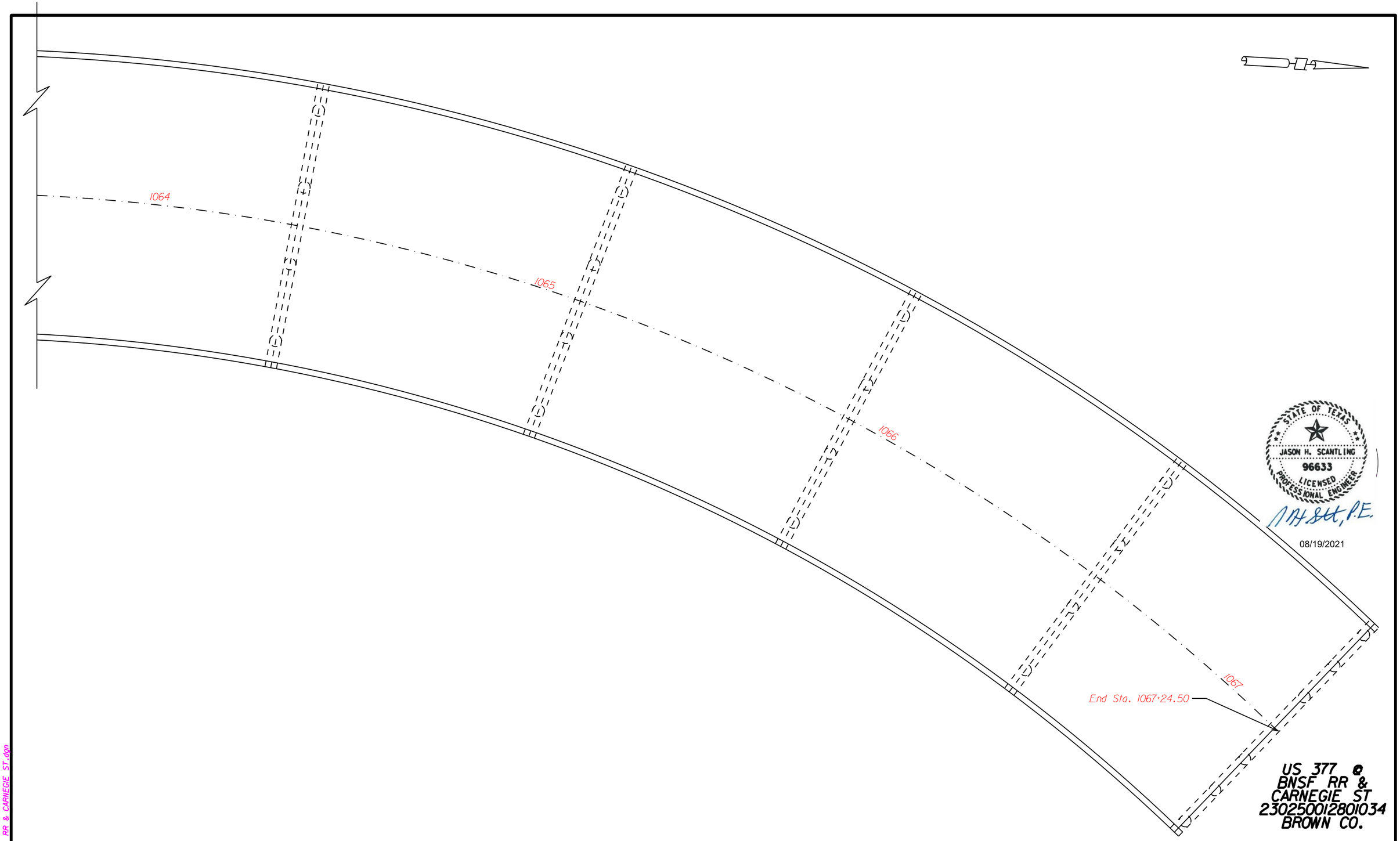

STATE OF TEXAS
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96633
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JHS, P.E.

08/19/2021

US 377 @
BNSF RR &
CARNEGIE ST
230250012801034
BROWN CO.

Sta. 1056+64 - 1067+80
13 Simple Span Prestressed Concrete I-Beam Bridge
On Concrete Column Bents

CONT	SECT	JOB	HIGHWAY
0288	01	039,etc.	SH 16,etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE,ETC.		167

DATE: 8/18/2021 4:35:21 PM
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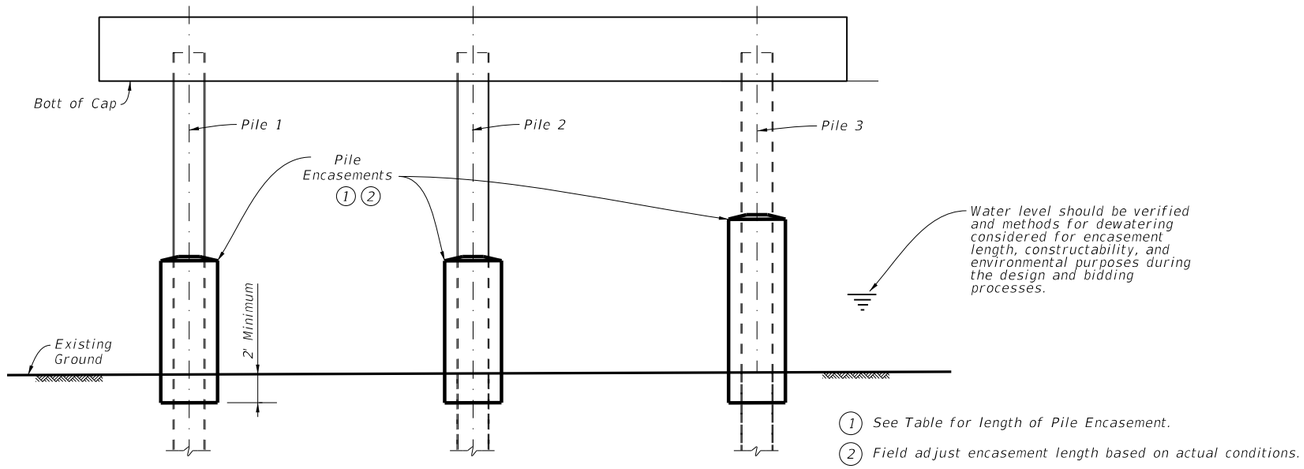
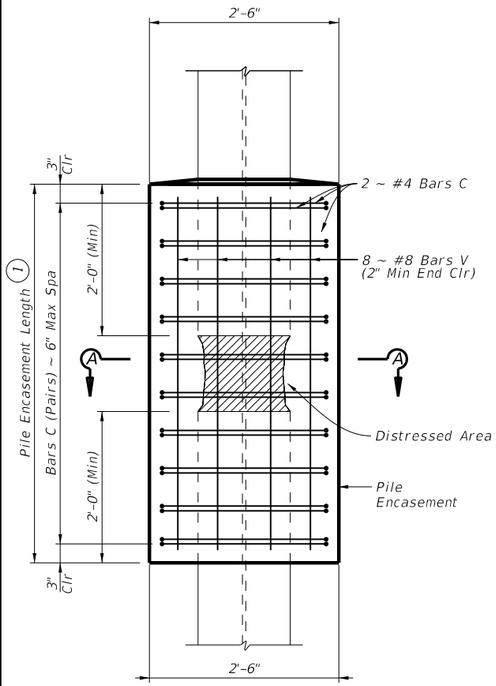


(1) See Table for length of Pile Encasement.

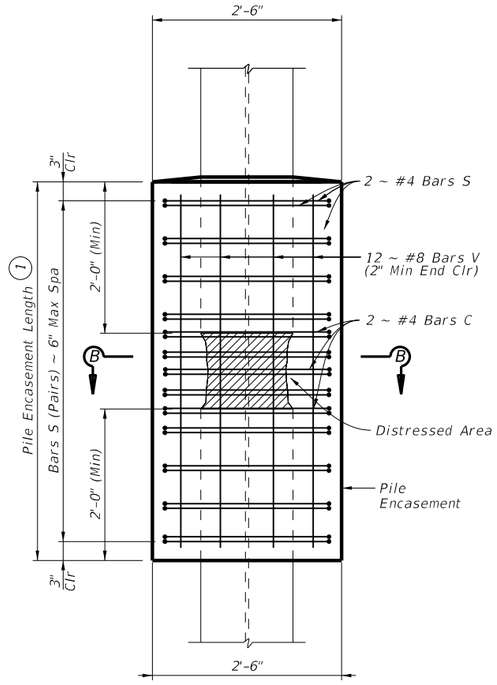
(2) Field adjust encasement length based on actual conditions.

TYPICAL BENT ELEVATION

(Looking Upstation)

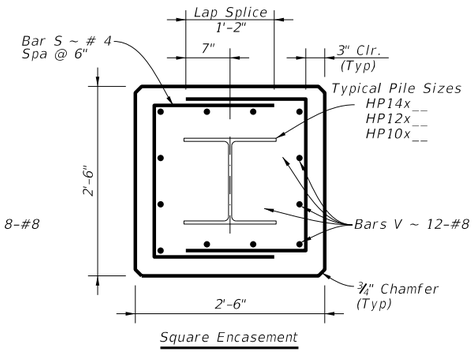


ELEVATION OF ROUND ENCASEMENT

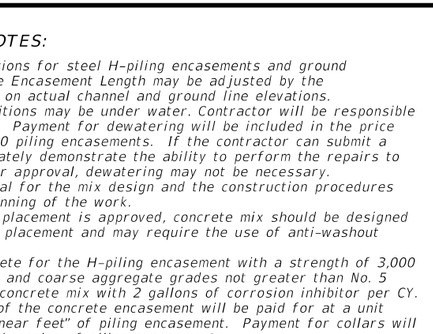


ELEVATION OF SQUARE ENCASEMENT

Round Encasement



Square Encasement



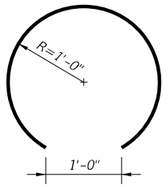
Square Encasement
Confinement

SECTIONS SHOWING REINFORCING AND CONCRETE ENCASEMENT

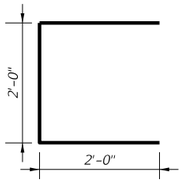
SECTION A-A

SHOWING REINFORCING NEAR DISTRESSED AREA

SECTION B-B



BAR C (#4)



BAR S (#4)

Arrange Bar C pairs to provide 1'-0" opening on opposite faces:

GENERAL NOTES:

Verify dimensions for steel H-piling encasements and ground elevations. Pile Encasement Length may be adjusted by the Engineer based on actual channel and ground line elevations.

Existing conditions may be under water. Contractor will be responsible for dewatering. Payment for dewatering will be included in the price bid for Item 420 piling encasements. If the contractor can submit a plan and adequately demonstrate the ability to perform the repairs to the engineer for approval, dewatering may not be necessary.

Obtain approval for the mix design and the construction procedures before the beginning of the work.

If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures.

Provide concrete for the H-piling encasement with a strength of 3,000 psi in 24 hours and coarse aggregate grades not greater than No. 5 ($\frac{3}{4}$"). Provide a concrete mix with 2 gallons of corrosion inhibitor per CY.

Construction of the concrete encasement will be paid for at a unit price bid of "Linear feet" of piling encasement. Payment for collars will be included in the price of piling encasement.

All steel reinforcing is to be Grade 60.

PILE ENCASEMENT PROCEDURE:

1) Verify channel line elevations and report to the Engineer for possible adjustments.
2) Submit a concrete mix design and procedures for casting the encasements for approval.
3) Clean mud, grease, loose rust and paint on the H-piling with hand tools and high pressure water.
4) Place and secure the steel reinforcement and install formwork.
5) Place the concrete in the encasement per approved procedures and in accordance with Item 420.
6) Leave forms in-place for at least 48 hours and until the concrete reaches a compressive strength of 3000 psi.

PILE ENCASEMENT DETAILS

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

Texas Department of Transportation | Bridge Division

PILE ENCASEMENT DETAILS

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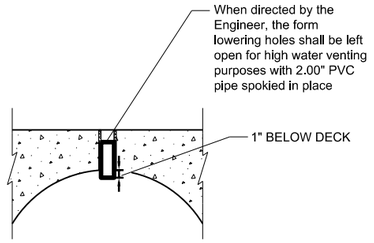
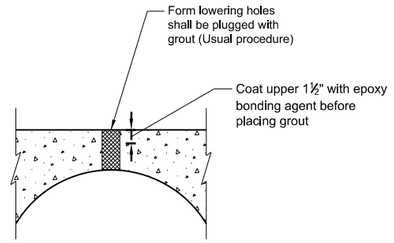


OPTION 1: FORM LOWERING HOLE TREATMENT

Scale: N.T.S.



OPTION 2: FORM LOWERING HOLE TREATMENT

Scale: N.T.S.

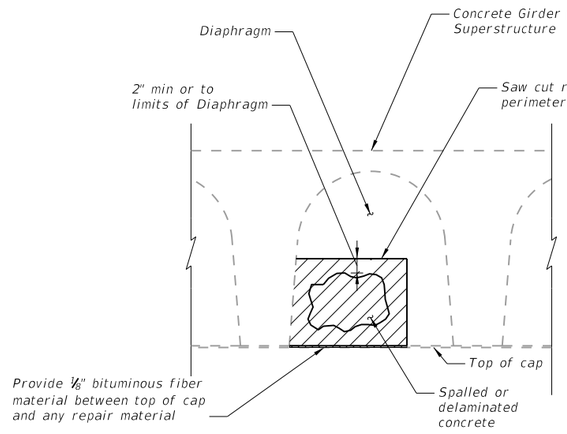
FORM LOWERING HOLE TREATMENT NOTES:

Clean hole to remove oil and other contaminants.

Provide Type V epoxy per DMS-6100, "Epoxies and Adhesives".

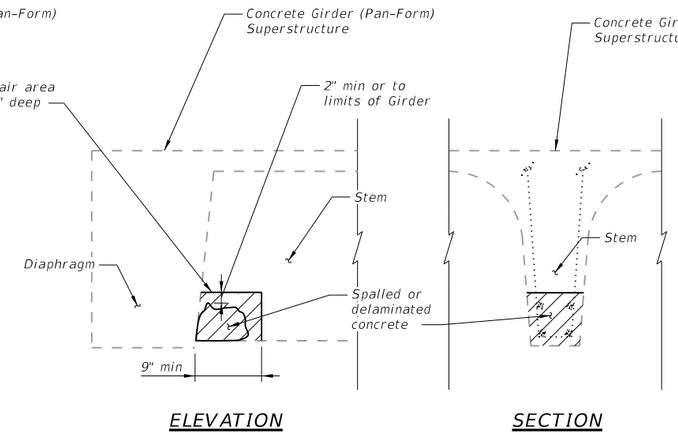
Repair as full-depth bridge deck repair per TxDOT Concrete Repair Manual Chapter 3, Section 4. Saw-cutting is not required.

Repairs are paid for as Item 429, "Concrete Structure Repair".



TYPICAL DIAPHRAGM REPAIR

Scale: ½" = 1'-0"



TYPICAL GIRDER STEM REPAIR

Scale: ½" = 1'-0"

CONCRETE REPAIR NOTES:

Damage locations and quantities are shown in the plans. Immediately notify TxDOT if any discrepancies are noted between the plans and actual conditions.

Submit detailed repair procedures, including proposed proprietary materials, for approval prior to commencing work. Repairs are considered "Intermediate Spalls" and shall be repaired following Chapter 3, Section 2 of the TxDOT Concrete Repair Manual.

Some repair areas indicated do not exhibit visible spalling and will need to be identified by sounding the concrete with hammers to determine the location and limits of repairs.

Sound all surfaces to identify and mark all delaminated areas for review and approval by the Engineer. Confirm square footage of repair areas prior to commencing removal and notify Engineer of any discrepencies. Provide access to Engineer for verification.

Notify Engineer once existing concrete is removed and repair areas for each span have been prepared. Provide access to the Engineer for verification of prepared repair areas.

The Traffic lane above concrete girder stem repairs shall be closed for a minimum of 24 hours after repairs have been made.

Repairs are paid for as Item 429, "Concrete Structure Repair".

STATE OF TEXAS
JASON H. SCANTLING
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09/03/2021

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CONCRETE SUPERSTRUCTURE REPAIR DETAILS

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DATE:
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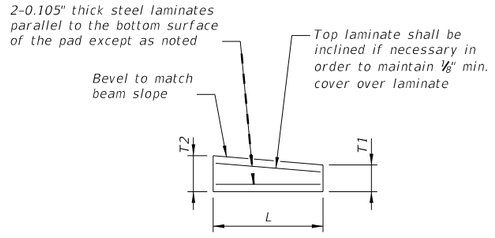
BEARING REPLACEMENT NOTES:

Replace existing bearing per Special Specification 4002, "Elastomeric Bearing Pads".

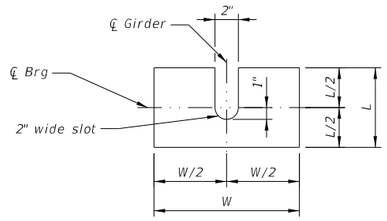
Raise the existing span in accordance with Item 495, "Raising Existing Structures", as required to remove bearings. Locations with existing dowels are indicated in the Table of Repairs. The bearing shall be removed without damaging the existing dowel. This may require the span to be raised on both ends in order to achieve clearance over the dowel to remove the existing pad in accordance with Item 495, "Raising Existing Structures". It is acceptable to cut existing pad to facilitate removal.

New bearing pads shall be manufactured in accordance with Engineer's design.

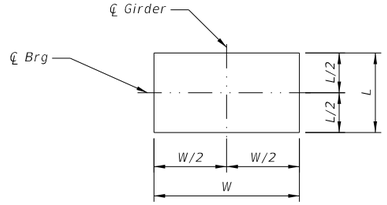
Following installation of new bearing pad apply stripe coat of Type V Epoxy at interface of pad and concrete pedestal to secure pad.



LAMINATED BEARING ELEVATION



PAD PLAN WITH DOWEL



PAD PLAN WITHOUT DOWEL

ELASTOMERIC BEARING REPLACEMENT DETAILS

Scale: 1" = 1'-0"

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ELASTOMERIC BEARING REPLACEMENT DETAILS

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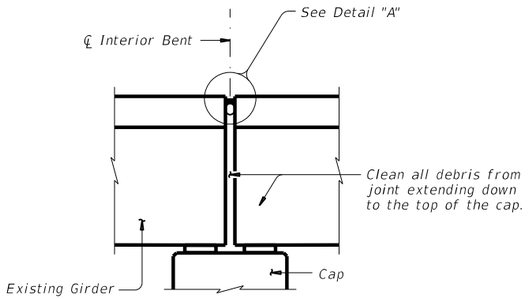
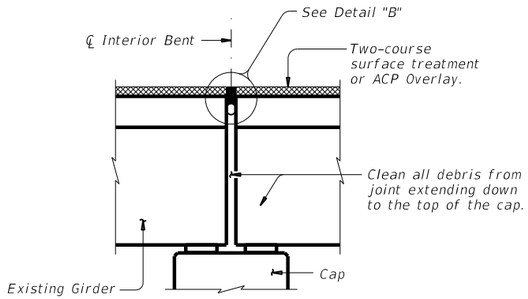


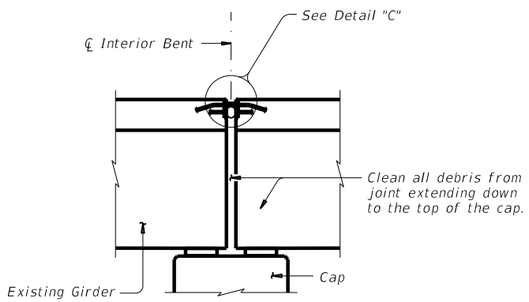
JOINT WITH SILICONE SEAL

(used without ACP Overlay)



JOINT WITH HOT POURED RUBBER SEAL

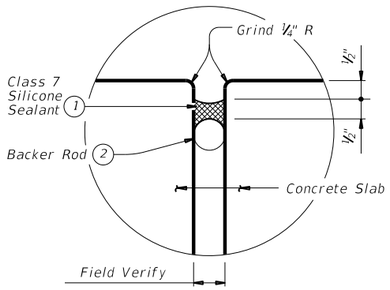
(used with ACP Overlay)



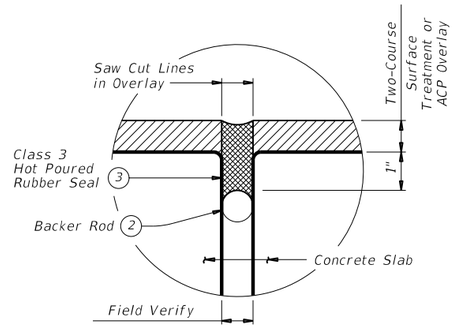
ARMOR JOINT

(used without ACP Overlay)

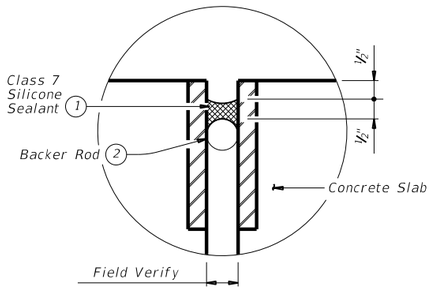
1. Use Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
3. Use Class 3 hot poured rubber seal in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."



DETAIL "A"



DETAIL "B"



DETAIL "C"

(Stud anchors not shown for clarity)

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.
4) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT POURED RUBBER SEAL

1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3) Place backer rod into joint opening 1" below the top of concrete. Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.
4) Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS

1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2) Abrasive blast clean existing steel surface where silicone seal is to be placed.
3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
4) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.
5) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

STATE OF TEXAS
JASON H. SCANTLING
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PROFESSIONAL ENGINEER

08/19/2021

Texas Department of Transportation

Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

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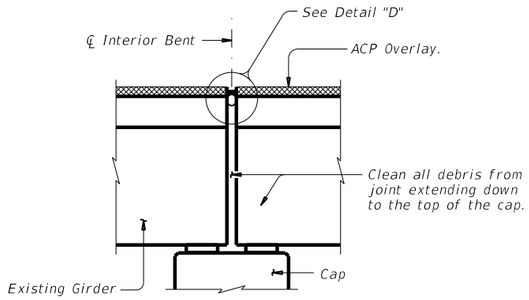
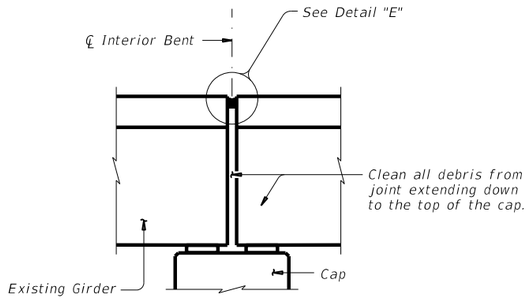


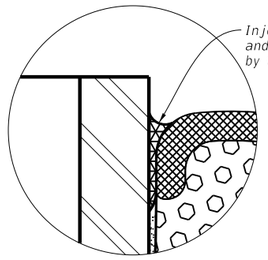
HEADER JOINT WITH SILICONE SEAL

(used with ACP Overlay with joints more than 100 ft apart)

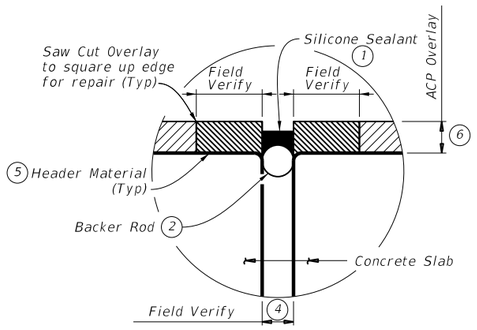


JOINT WITH PRECOMPRESSED FOAM WITH SILICONE SEAL

(used without ACP Overlay)



DETAIL "F"



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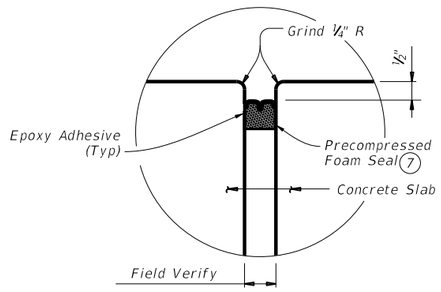

DETAIL "E"

PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR

1) Clean joint opening of all old expansion materials/devices, dirt, and all other delterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck spalls that leave less than 6" of original deck in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.

3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.

4) Form the joint opening to the reqired width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."

5) Place backer rod into joint opening 1" below the top of header material. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

6) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of header in travel lanes and ⅛" below top of header in shoulders.

PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM WITH SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.

2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.

3) Abrasive blast clean existing joint surfaces where seal is to be applied.

4) Wipe down joint surfaces to remove contaminates.

5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.

6) Apply epoxy to joint opening side surfaces.

7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.

8) Recess top of joint seal 1/2" in travel lanes and 1/4" in shoulders.

9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Detail "F".

1) Use Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

2) Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

4) Match existing joint opening or set at a minimum:
   a. 1" at 70°F when the distance between joints is 150 ft or less
   b. 2" at 70°F when the distance between joints is greater than 150 ft.
   c. As directed by the Engineer.

5) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but not to exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."

6) Maximum thickness is 4".

7) See Table of Approved Foam Seal Manufacturers on Sheet 3 of 3.

GENERAL NOTES

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting joint opening, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the foot of "Cleaning and Sealing of Existing Joints."

Repair of existing header joint material is paid for by Item 785-6006, "Bridge Joint Repair (Header)." Provide header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems."

Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

For Class 3 Hot Poured Rubber Seal, provide backer rod compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

Provide Class 3 sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.

Provide Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 Sealant cannot be effectively placed in the vertical position, a Class 4 Sealant compatible with the Class 7 sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.

08/19/2021

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Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

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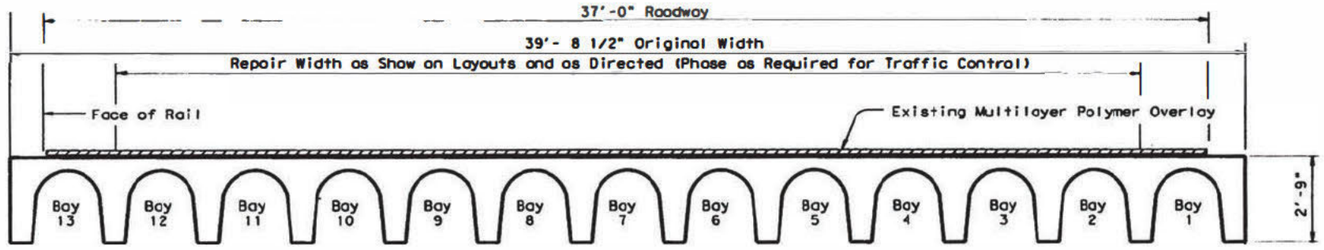
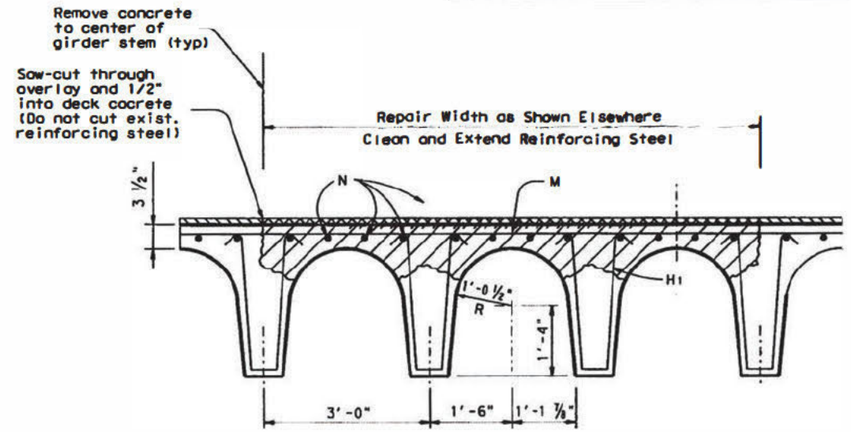
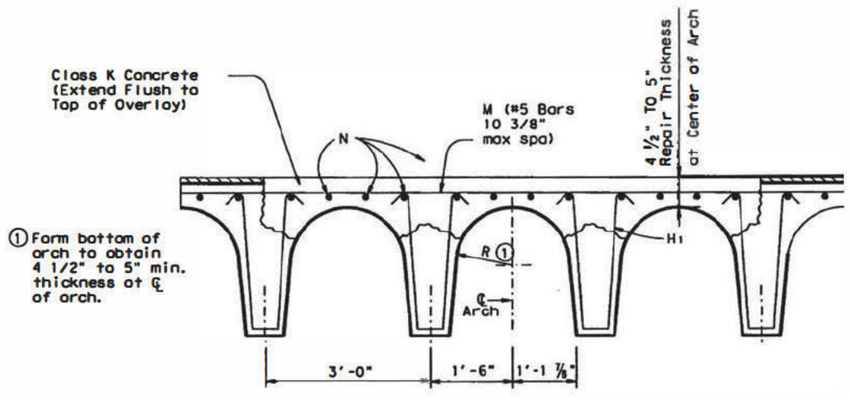


SECTION VIEW OF EXITING BRIDGE

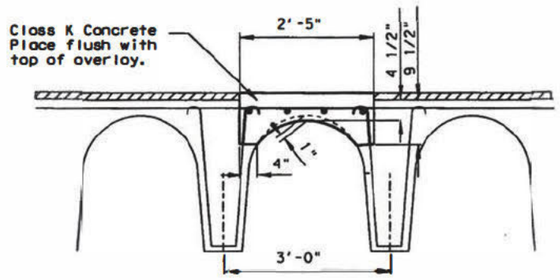


MULTI-BAY CONCRETE REMOVAL

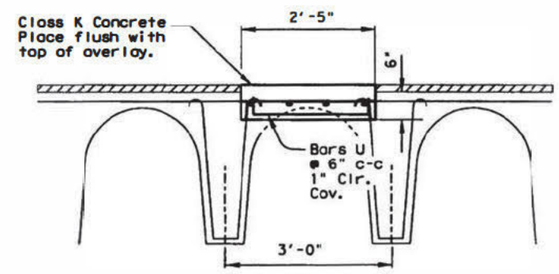
1'-3" Wide Full Width End Blocks not Shown
Remove Concrete a min. of 1" Below Reinforcing Steel



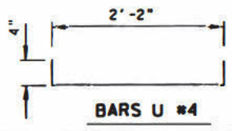
MULTI-BAY CONCRETE REPAIR



SINGLE-BAY CONCRETE REPAIR



SINGLE-BAY CONCRETE REPAIR (ALTERNATE OPTION)



BARS U #4

Approximate volume of concrete for repair is 2 CF/LF/bay of repair - For Contractor's information only - Bid Item is measured and paid for by the square foot of deck surface area repaired.

CONSTRUCTION NOTES:

1. Mark area of repair and obtain approval prior to saw-cutting concrete.
2. Saw-cut thorugh polymer overlay and 1/2" into concrete surface, but do not cut existing reinforcing steel, around the perimeter of the repair area.
3. Remove concrete as shown in "Concrete Removal View". Limit concrete removal equipment to 15 lbs. max. Class pneumatic hammer within 3" of remaining deck concrete.
4. Salvage existing reinforcing steel in accordance with Item 429, "Concrete Structure Repair." Replace severed reinforcing steel as directed and add bars M & N if missing as shown.
5. Form bottom of arch by an approved method. Place 3/4" foam at end of spans to create joint between adjacent span.
6. Clean and saturate (SSD) concrete repair surfaces just prior to placing concrete.
7. Place Class K concrete in repair area. Extend concrete repair flush with top surface of polymer overlay.
8. Wet cure for a minimum of 2 days and until concrete has obained a minimum of 3,000 psi compressive strength.

GENERAL NOTES:

-Submit proposed concrete mix design information for approval. Required minimum compressive strength is 3,000 psi at time traffic is placed repair.

-Submit sketch proposed forming system for approval.

-Repair is in accordance with Item 429, "Concrete Structure Repair." Work is measured by the square foot of horizontal surface area. Bid for Concrete Structure Repair (BRDG DECK)(FULL DEPTH), includes all materials, labor, equipment, and incidentals to complete the repair.

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

08/19/2021

HS20 LOADING

Texas Department of Transportation — Bridge Division

40'-0" CONCRETE SLAB AND GIRDER SPANS REPAIR PALO PINTO CREEK BRIDGE EB IH 20

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LEVELS DISPLAYED
PATH:

UPDATED 6/22/2017

During the planning phase of project development the following environmental permits, issues, and commitments have been developed during coordination with resource agencies, local governmental entities, and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities, as additional environmental clearances may be required.

I. Clean Water Act, Sec. 402 Texas Pollutant Discharge Elimination System

(Addresses CGP and MS4 Storm Water requirements for the project.)

(In the event that the Contractor implements a PSL on or within one mile of the project, a Site Notice and/or a NOI will apply.)

☐ No Action Required ☑ Required Action

Action No. 1

The project disturbs less than one acre of surface area. The contractor is responsible for the PSL as defined in the Standard Specifications for construction and Maintenance of Highways, Street, and Bridges (2014 Edition, Section 7.7.6, Page 42). The total disturbed acreage is the combined acreage to be disturbed on the project and the contractor's PSL.

The EPIC must be updated if the disturbed area increases to one or more acres during the course of construction (refer to following sections). It may become necessary to post a site notice and/or NOI for the project and/or PSL.

Commitment No. 1

Refer to the SW3P Plan Sheet, BMPs and Detail. It will address sweeping, chemical storage, sanitary waste, and all other management practices.

MS4 operators that receives discharge from the project: -N/A-

II. Clean Water Act, Section 401 and 404 Compliance

(Addresses Nationwide Permits, Individual Permits, and Wetlands.)

(Filling, dredging, or excavating in any water bodies, rivers, creeks, streams, wetlands, or wet area is prohibited unless specified in the USACE permit and approved by the Engineer.)

(When temporary fill is implemented, only stated TxDOT standards will be used unless written authorization for an alternative is obtained from the Engineer. No equipment is allowed in any stream channel below the Ordinary High Water Mark except on temporary stream crossings or drill pads.)

☐ No Action Required ☑ 404 Permit and 401 Certification Required

Permit	Required Action
NWP #3(a)	Adhere to permit and associated conditions

Waters of the US	App. Plan Sheet(s)	Waters of the US	App. Plan Sheet(s)
Various Locations	See bridge layouts & BMP Placement sheet	Various	Various

A United States Army Corp of Engineers permit was not obtained for the following locations; therefore, work within the ordinary high water mark of each of the following creeks shall not occur - 23068000714013 (FM 2945 over Sandy Creek)

Best Management Practices for applicable 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

- ☑ Temporary Vegetation
- ☐ Mulch
- ☐ Interceptor Swale
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Blankets, Matting
- ☐ Sod
- ☐ Diversion Dike
- ☐ Mulch Filter Berms and Socks
- ☐ Compost Blankets

Category II (Sedimentation Control)

- ☐ Sand Bag Berm
- ☑ Silt Fence
- ☐ Triangular Filter Dike
- ☐ Stone Outlet Sediment Traps
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Rock Berm
- ☐ Hay Bale Dike
- ☐ Brush Berms
- ☐ Sediment Basins
- ☐ Mulch Filter Berms and Socks

General Condition 25 - Category III BMPs required

Category III (Post-Construction TSS Control)

- ☐ Retention/Irrigation
- ☐ Extended Detention Basin
- ☐ Vegetative Filter Strips
- ☐ Grassy Swales
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Constructed Wetlands
- ☐ Wet Basins
- ☐ Vegetation-Lined Ditches
- ☐ Sand Filter Systems
- ☐ Mulch filter Berms and Socks
- ☐ Sedimentation Chambers

III. Cultural Resources

(Addresses any special circumstances associated with cultural resources, such as archeological or historic sites.)

(Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.;cease work in the immediate area and contact the Engineer immediately.)

☑ No Action Required ☐ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	---	---

IV. Vegetation Resources

(Addresses any special circumstances associated with vegetation, such as large trees to be avoided, or mitigation that will occur as part of the project.)

☐ No Action Required ☑ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	All	Avoid non-mow locations for stockpiles and equipment parking/storage.
2.	Project Limits	Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

V. Federal Listed, Proposed, Threatened, Endangered Species, Critical Habitat, State Listed Species, Candidate Species, and Migratory Bird Treaty Act (MBTA)

(Addresses any special habitat that may need to be avoided, lists any threatened or endangered species where habitat was observed and might be impacted within the project area, and lists any precautions such as nesting seasons for migratory birds.)

☐ No Action Required ☑ Required Action

Species Potentially within Project Area & Description	Habitat Description

The Contractor is advised to avoid harm to species. When species enter the work area allow to leave work site. If bats are identified under bridges or culverts notify District Environmental Specialist and stop work if work will potentially harm bats.

The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. Migration patterns would not be affected by the proposed project. The contractor will remove all old migratory bird nests from any structure where work would be done from September 1 through the end of February. In addition, the contractor will be prepared to prevent migratory birds from building nests between March 1 and August 31, per the Environmental Permits, Issues, and Commitments (EPIC) plans. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young shall be avoided.

VI. Hazardous Material or Contamination Issues

(Addresses any previously identified high risk sites associated with hazardous materials that may be encountered during construction.)

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contractor will follow all applicable storage and management requirements for liquid oil products, liquid petroleum products, and other chemical liquids as per 40 CFR 112 (a.k.a. SPCC) and/or TCEQ Construction General Permit for storm water management.

Contact the Engineer if any of the following are detected:
- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells/odors
- Underground storage tanks
- Evidence of leaching or seepage of substances
- Any other evidence indicating possible hazardous materials or contamination discovered on-site

---

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structure not including box culverts)?

☑ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.
Are the results of the asbestos inspection positive (is asbestos present)?

☑ Yes ☐ No

If "Yes", then TxDOT must retain a Texas Department of State Health Services (DSHS) licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 10 working days prior to scheduled abatement and/or demolition.

If "No", then TxDOT is still required to notify DSHS 10 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Bridges on this project may contain Lead-Containing Paint (LCP) or other items that contain lead. The location of (LCP) is identified in the General Notes. Item 6.10.1.2 in the 2014 TxDOT Standard Specifications shall be utilized for this project.

ACM and LCP inspection reports for bridges are available from TxDOT BWD.

VII. Other Environmental Issues

(Addresses any other environmental issues that may not have been covered in other sections.)

☑ No Action Required ☐ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	---	---

LIST OF ABBREVIATIONS

BMP: Best Management Practice
CGP: Construction General Permit
DSHS: Texas Department of State Health Services
FEMA: Federal Emergency Management Agency
FHWA: Federal Highway Administration
MOA: Memorandum of Agreement
MOU: Memorandum of Understanding
MS4: Municipal Separate Stormwater Sewer System
MBTA: Migratory Bird Treaty Act
NOI: Notice of Intent
NOT: Notice of Termination
NWP: Nationwide Permit
SPCC: Spill Prevention Control and Countermeasure
SW3P: Storm Water Pollution Prevention Plan
PCN: Pre-Construction Notification
PSL: Project Specific Location
TCEQ: Texas Commission on Environmental Quality
TPDES: Texas Pollutant Discharge Elimination System
TPWD: Texas Parks and Wildlife Department
TxDOT: Texas Department of Transportation
T&E: Threatened and Endangered Species
USACE: U.S. Army Corp of Engineers
USFWS: U.S. Fish and Wildlife Service

SH 16, ETC. ENVIRONMENTAL PERMITS, ISSUES, AND COMMITMENTS (EPIC)

Texas Department of Transportation
BROWNWOOD DISTRICT

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		174

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SITE DESCRIPTION

PROJECT LIMITS:

C-092300064
At various locations (see site maps)

Latitude = Various
Longitude = Various

LOCATION MAPS:

Refer to site maps for project locations.

PROJECT DESCRIPTION:

For miscellaneous bridge repair at various locations in Brown, Coleman, Comanche, Eastland, McCulloch, and San Saba Counties.

MAJOR SOIL DISTURBING ACTIVITIES:

No major soil disturbing activities.

TOTAL PROJECT AREA:	0.805 Acres
TOTAL AREA TO BE DISTURBED:	0.805 Acres

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

C-092300064
The existing soils vary. The prime use is maintained transportation crossing with various herbaceous and grass vegetation with 70% vegetative cover.

NAME OF RECEIVING WATERS:

C-092300064
Runoff from project flows into various stream Segments.

EROSION AND SEDIMENT CONTROLS

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE:
All erosion controls will be maintained in good working order. If a repair is necessary, it will be made at the earliest possible date, but no later than seven (7) calendar days after the ground has dried sufficiently to prevent further damage from equipment. The areas around creeks and drainage ways shall have priority over other areas on the project site.

INSPECTION:
An inspection will be performed by a TxDOT inspector at least once every seven (7) calendar days. An inspection and maintenance report will be made per each inspection. Stormwater controls will be modified as directed by the Engineer based on these reports.

WASTE MATERIALS:
Any waste materials generated during construction will be disposed of in accordance with existing federal, state, and local laws.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
At a minimum, any products in the following categories are considered to be hazardous: Fuels, Lubricating products, Asphalt products, or Concrete curing compounds and any additives. In the event of a spill which may be hazardous, clean-up will be done in accordance with federal, state, and local regulations.

SANITARY WASTE:
Sanitary waste from portable units will be collected by a licensed sanitary waste management contractor.

OFF SITE VEHICLE TRACKING AND DUST CONTROL:

- [X] DUST CONTROL (OFF SITE) AS NEEDED- PER ENGINEER
- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [ ] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [ ] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

REMARKS:
Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body or stream bed. Construction staging area and vehicle maintenance area shall be constructed by the contractor in a manner to minimize the runoff pollutants. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, false work, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

For off R.O.W. facilities the contractor shall comply with TCEQ requirements.

The contractor is responsible for ensuring that all subcontractors are aware of and comply with all components of the SW3P per Item 506.

Sedimentation Basins - Since the area disturbed is less than 10 acres per drainage area; a sedimentation basin is not required.

Best Management Practices:

Erosion	*Sedimentation*	*Post-Construction TSS*
[X] Temporary Vegetation	[X] Silt Fence	[ ] Vegetative Filter Strips
[ ] Blankets/Matting	[ ] Rock Berm	[ ] Retention/Irrigation Systems
[ ] Mulch	[ ] Triangular Filter Dike	[ ] Extended Detention Basin
[ ] Sodding	[ ] Sand Bag Berm	[ ] Constructed Wetlands
[ ] Interceptor Swale	[ ] Straw Bale Dike	[ ] Wet Basin
[ ] Diversion Dike	[ ] Brush Berms	[ ] Erosion Control Compost
[ ] Erosion Control Compost	[ ] Erosion Control Compost	[ ] Mulch Filter Berm and Socks
[ ] Mulch Filter Berm and Socks	[ ] Mulch Filter Berm and Socks	[ ] Compost Filter Berm and Socks
[ ] Compost Filter Berm and Socks	[ ] Compost Filter Berm and Socks	[ ] Vegetation Lined Ditches
	[ ] Stone Outlet Sediment Traps	[ ] Sand Filter Systems
	[ ] Sediment Basins	

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

The order of activities will be as follows:

1. Preserve existing vegetative cover as much as possible.
2. Install temporary sediment control fencing and other items as shown on plans prior to any soil disturbing activities.
3. Perform structure work and perform any necessary excavation, embankment and grading, and temporary seeding.
4. Place permanent seeding as shown in the plans and as directed by the Engineer.

STORM WATER MANAGEMENT:

Storm water will be carried to cross drainage structures by side road ditches and culverts which will empty into the various natural runoff channels.

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS, P.E.

09/07/2021

SH 16, ETC.
BROWNWOOD DIST.
STORM WATER POLLUTION PREVENTION PLAN

Texas Department of Transportation
Brownwood District Office
2495 Highway 183 North
Brownwood Texas, 76802

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		175

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EXACT LOCATION & QUANTITIES OF SW3P ITEMS TO BE DETERMINED IN THE FIELD

164-6003	164-6009	164-6011	506-6038	506-6039
BROADCAST SEED (PERM) (RURALXCLAY) SY	BROADCAST SEED (TEMP) (WARM) SY	BROADCAST SEED (TEMP) (COOL) SY	TEMP SEDIMENT CONT FENCE INSTLL LF	TEMP SEDIMENT CONT FENCE REMOVE LF
3900	1950	1950	2600	2600

NOTES: APPROXIMATELY 100 LF OF SEDIMENT CONTROL FENCE SHALL BE PLACED AT 26 LOCATIONS.

APPROXIMATELY 150 SY OF SEEDING SHALL BE PLACED AT 26 LOCATIONS.

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

JHS, P.E.

08/19/2021

BMP PLACEMENT

CONT	SECT	JOB	HIGHWAY
0288	01	039, etc.	SH 16, etc.
DIST	COUNTY		SHEET NO.
BWD	COMANCHE, ETC.		176

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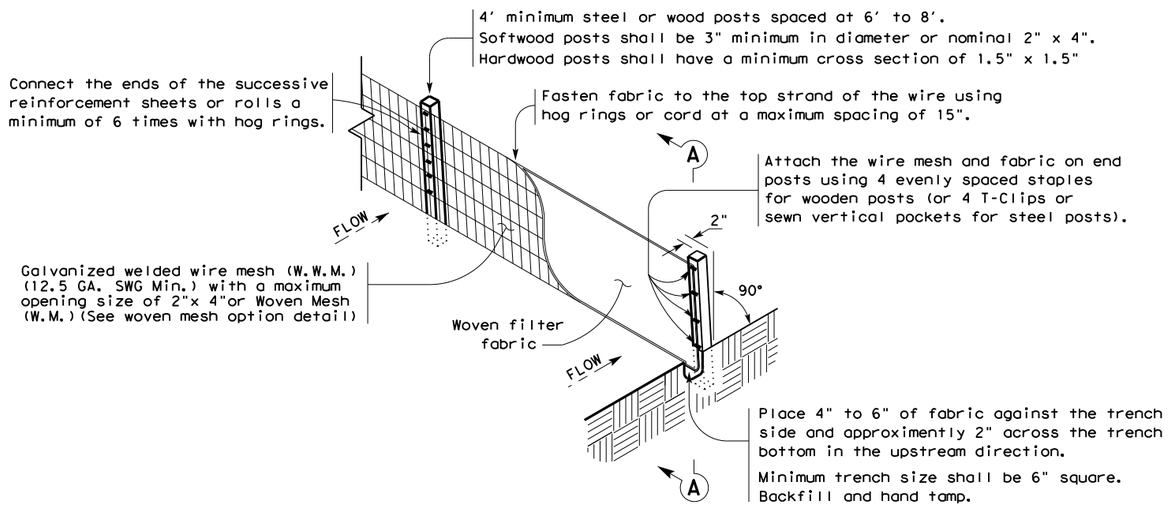
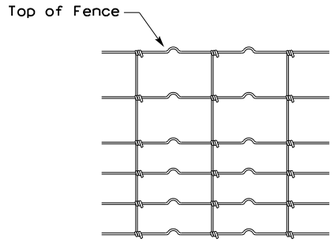
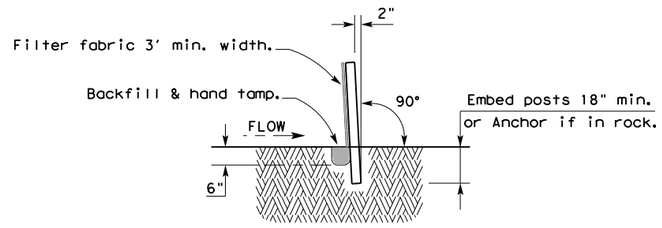


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

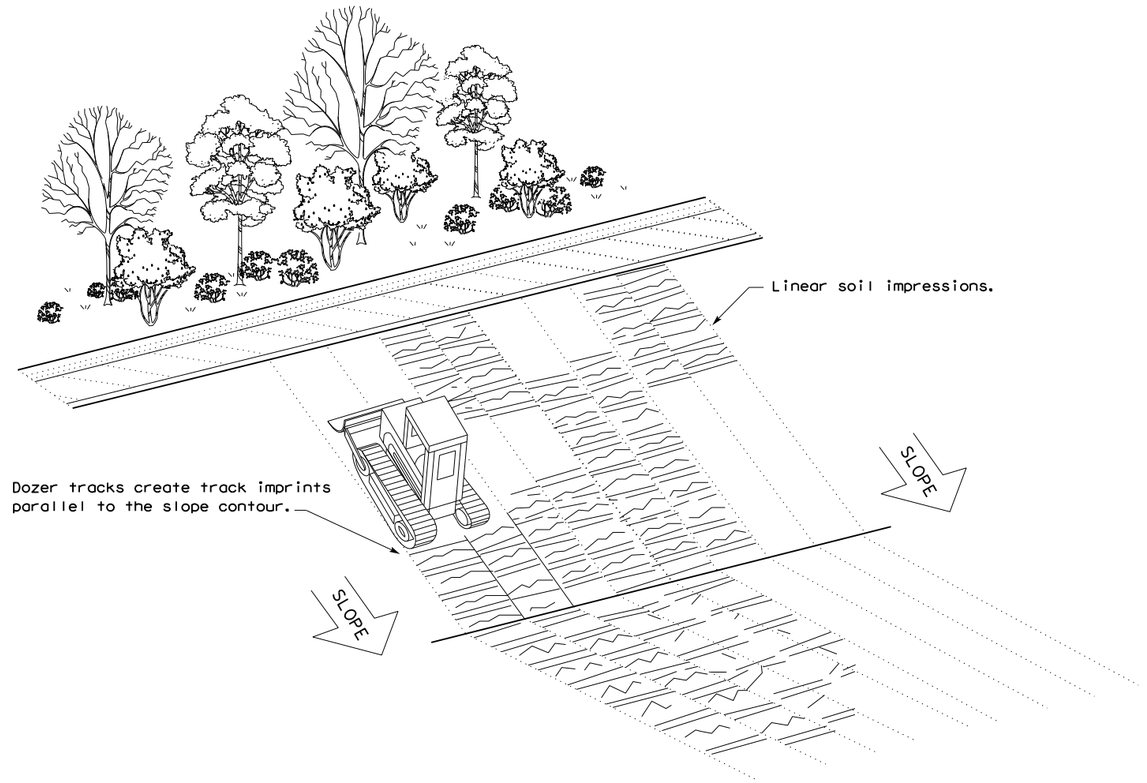
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		177

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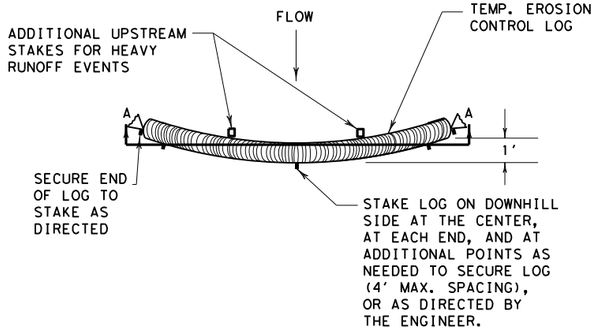
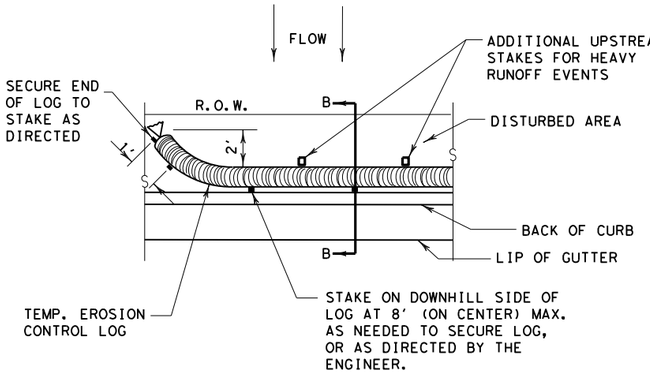
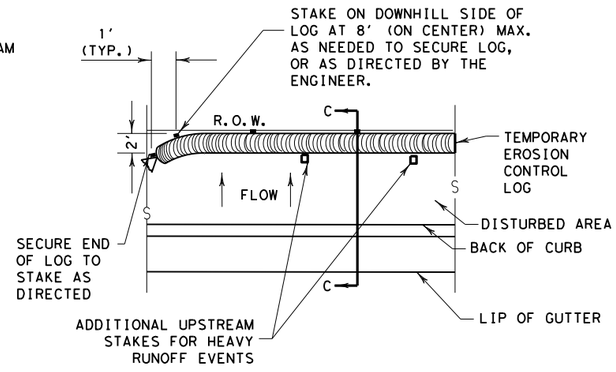


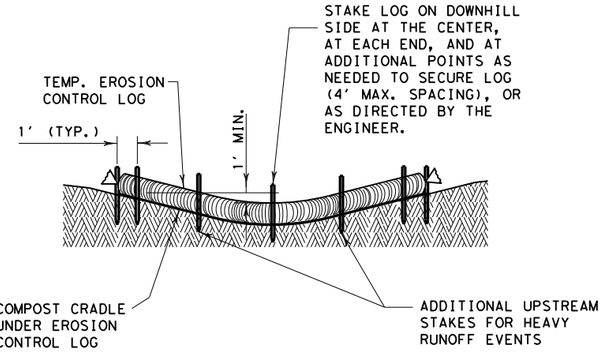
PLAN VIEW



PLAN VIEW



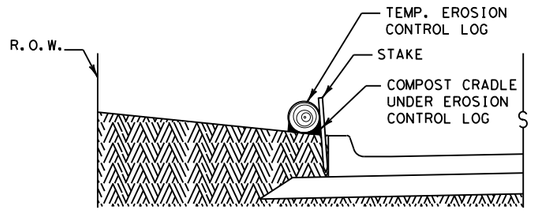
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

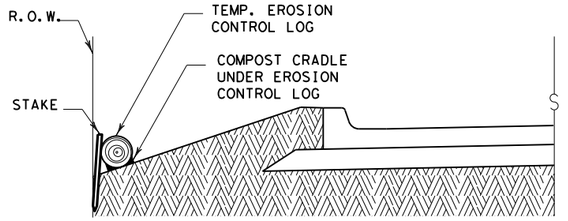
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

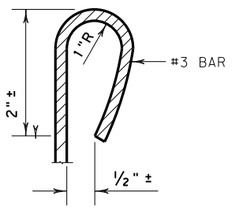
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

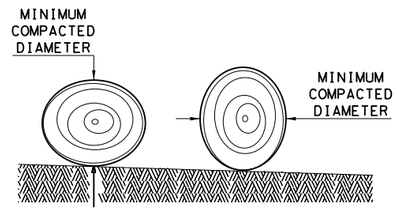
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

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© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		178

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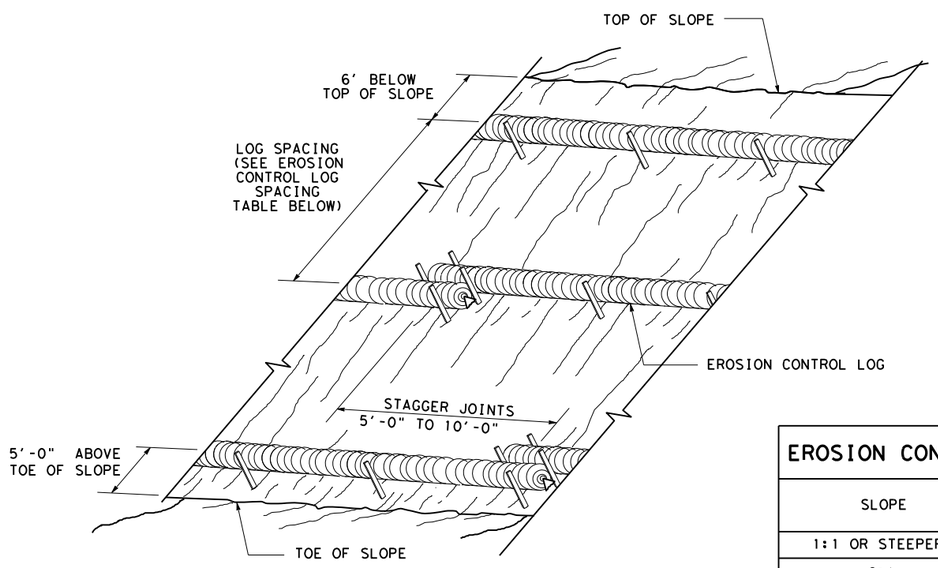
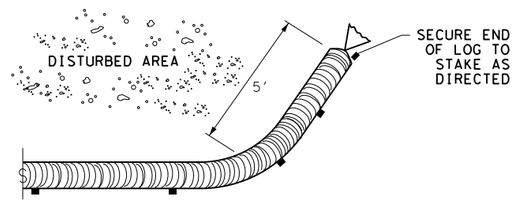


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

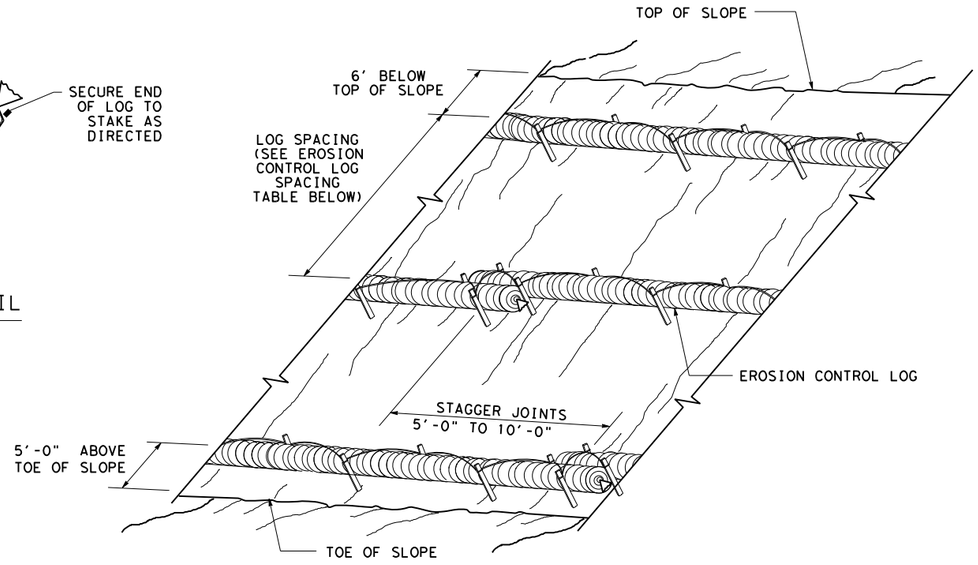
CL-SST



END SECTION RAP DETAIL

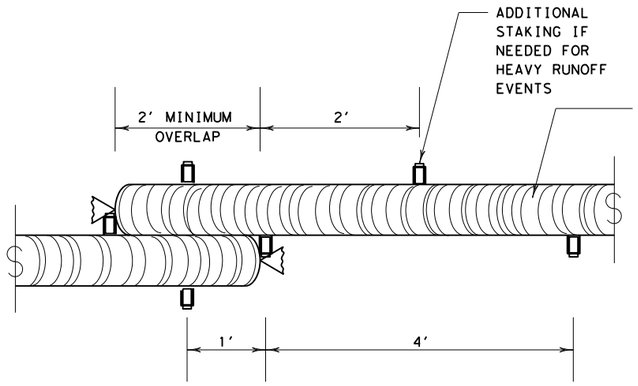
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

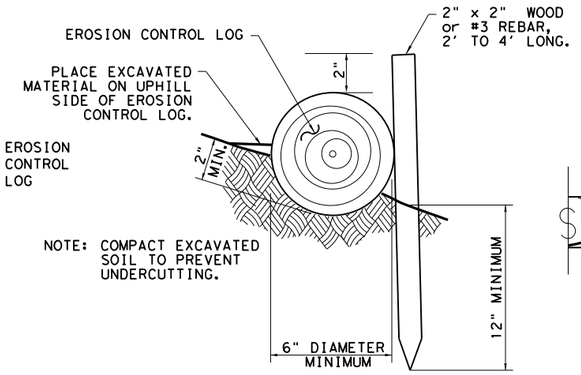
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

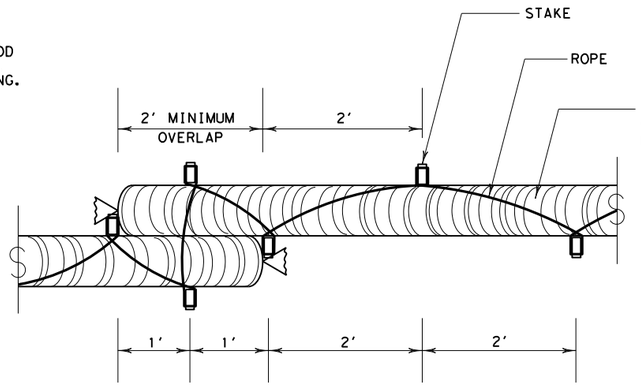


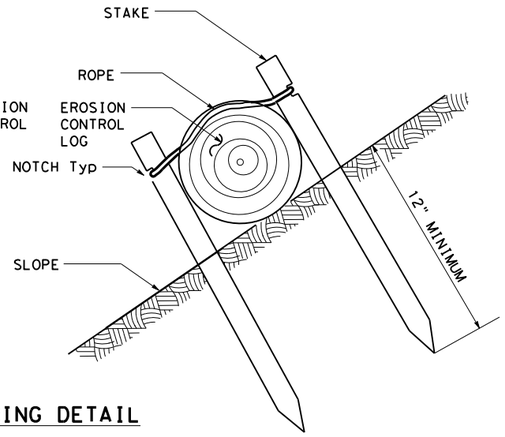


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

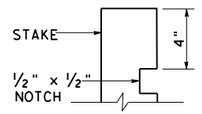
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

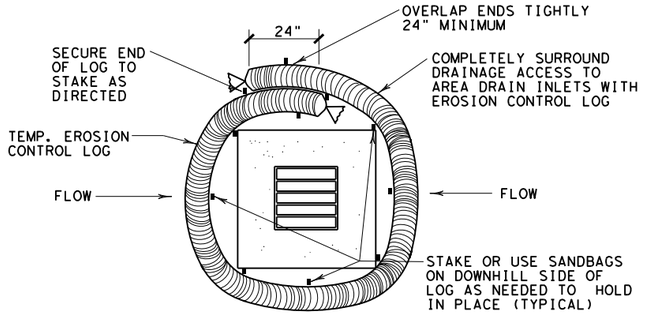
Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

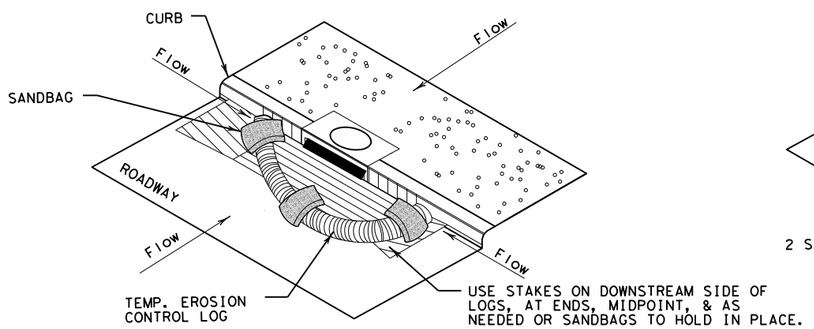
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0288	01	039, etc.	SH 16, etc.	
	DIST	COUNTY		SHEET NO.	
	BWD	COMANCHE, ETC.		179	

DATE: 8/19/2021
FILE: T:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\Standards\EC(9)-16.dgn



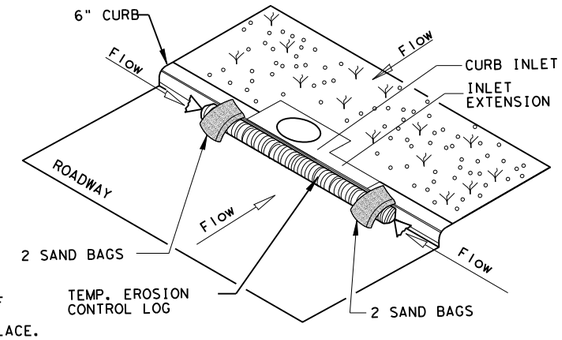
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

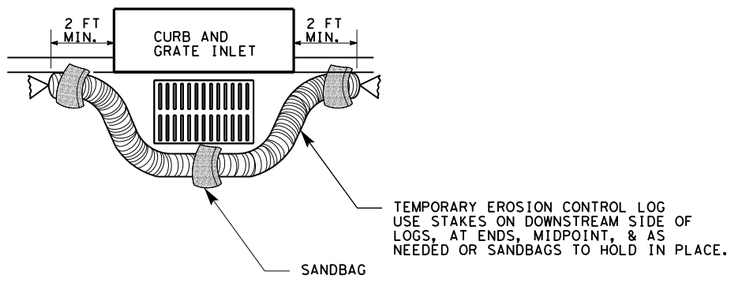
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

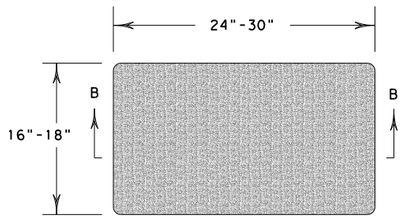
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		180

DATE: 8/31/2021 4:06:01 PM
FILE: I:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\RAILROAD SCOPE OF WORK.dgn

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 839 272J
Crossing Type: Highway Overpass
RR Company Owning Track at Crossing: Union Pacific Railroad Company
Operating RR Company at Track: Union Pacific Railroad Company
RR MP: 0363.480
RR Subdivision: Baird
City: Cisco
County: Eastland
CSJ at this Crossing: 0007-14
Highway/Roadway name crossing the railroad: FM 2945
# of regularly scheduled trains per day at this crossing: 9
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0.1%

Scope of Work at this Crossing to Be Performed by State Contractor:
Bridge Repair

Scope of Work at this Crossing to Be Performed by Railroad Company:
Flagging

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

None

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 3

On this project, night or weekend flagging is:

- [ ] Expected
- [X] Not Expected

Flagging services will be provided by:

- [X] Railroad Company: TxDOT will pay flagging invoices
- [ ] Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

- [X] UPRR - UP.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [ ] BNSF - BNSF.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [ ] KCS - KCS.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
  - Bottom Line On-Track Safety Services
  bottomline076@aol.com, 903-767-7630
- [ ] OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- [X] Not Required
- [ ] Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

- [ ] Required
- [X] Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability

- [ ] Not Required
- [X] Non - Bridge Projects — $2,000,000 / $6,000,000
- [ ] Bridge Projects — $5,000,000 / $10,000,000
- [ ] Other

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

- [ ] Not Required
- [X] Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- [ ] Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: Union Pacific

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- [X] Not Required
- [ ] Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Texas Union Pacific
Railroad Emergency Line at (800) 848-871
Location: DOT 839 272J
RR Milepost 0363.480
Subdivision Baird

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		181

DATE: 8/31/2021 4:07:01 PM
FILE: I:\BWDDSGTEAM\Jacob Perry\Bridge Maintenance Contract FY21\RAILROAD SCOPE OF WORK.dgn

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 021 216N
Crossing Type: Highway Overpass
RR Company Owning Track at Crossing: BNSF Railway Company
Operating RR Company at Track: BNSF Railway Company
RR MP: 0370.690
RR Subdivision: Lampasas
City: Santa Anna
County: Coleman
CSJ at this Crossing: 0078-05
Highway/Roadway name crossing the railroad: US 67
# of regularly scheduled trains per day at this crossing: 6
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 0.1%

Scope of Work at this Crossing to Be Performed by State Contractor:
Bridge Repair

Scope of Work at this Crossing to Be Performed by Railroad Company:
Flagging

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

None

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 5

On this project, night or weekend flagging is:

- [ ] Expected
- [X] Not Expected

Flagging services will be provided by:

- [X] Railroad Company: TxDOT will pay flagging invoices
- [ ] Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

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- [ ] UPRR - UP.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [X] BNSF - BNSF.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [ ] KCS - KCS.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
  - Bottom Line On-Track Safety Services
  bottomline076@aol.com, 903-767-7630
- [ ] OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- [X] Not Required
- [ ] Required: Contact Information for Construction Inspection:

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- [ ] Required
- [X] Not Required

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Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

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Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability

- [ ] Not Required
- [X] Non - Bridge Projects — $2,000,000 / $6,000,000
- [ ] Bridge Projects — $5,000,000 / $10,000,000
- [ ] Other

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- [ ] Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- [X] Not Required
- [ ] Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call BNSF Railway
Railroad Emergency Line at (800) 832-5452
Location: DOT 021 216N
RR Milepost 0370.690
Subdivision Lampasas

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2020	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		182

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		183

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of $\frac{1}{4}$ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0288	01	039, etc.	SH 16, etc.
	DIST	COUNTY		SHEET NO.
	BWD	COMANCHE, ETC.		184